

The **Communicator**

November-December 2020



The Changing Face of Ham Radio—starts on page 14

A Publication Of Surrey Amateur Radio Communications



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The **Communicator** is a publication of Surrey Amateur Radio Communications.

It appears bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

During non-publication months we encourage you to visit the Digital Communicator at ve7sar.blogspot.ca, which includes recent news, past issues of The Communicator, our history, photos, videos and other information.

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SARC maintains a website at www.ve7sar.net

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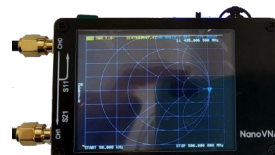
Daniel's Workbench—Has 4 articles this month!



Daniel VE7LCG with another set of fabulous projects and more

The NanoVNA

The first of features examining this useful and inexpensive Ham tool.





QRM

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...from the Editor's Shack

Do you have a photo or bit of SARC news to share? An Interesting link?

Something to sell or something you are looking for?

eMail it to [communicator at ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.

Another issue is ready to out. After riding at 93 for a while, we broke 100 (DXCC?) and now have 123+ countries that read The Communicator. Its nice that our corner of Canada and our hams are able to contribute to the hobby in this way. We appreciate your feedback and your requests to reprint articles. Keep those messages coming!

Shortly after celebrating his 85th birthday, Norm Schmidt VE7IIT recently suffered a stroke and has lost his sight. He's had to change from living on his own in a care home to full-care. We wish him all the best. Norm was a past contributor and avid reader.

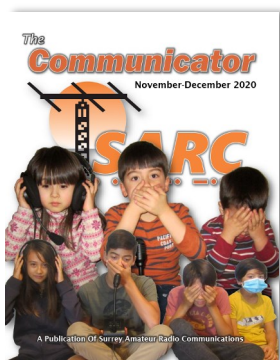
SARC is trying to get past the impact that marked the start of COVID. With great care we have resumed both on-line and limited live classes, our (socially distanced) Saturday coffee, and resumed regular meetings. It will likely be a while yet before we are fully back to normal but this lull cannot last forever.

We are always on the look-out for new contributors to this publication. A number of prolific hams have agreed to provide their material and we strive to bring you items that are informative, interesting, funny or newsworthy. If you write regularly (no matter where in the world) we'd appreciate hearing from you. This month for the first time ever we have Arie Kleingeld PA3A, a contributor from the Netherlands. Thank you Arie.

Ken Oelke VE6AFO allowed us to share "History of Amateur Radio in Canada" as part of our look back. Many will know Ken from his many contributions to RAC's The Canadian Amateur magazine. Thanks Ken and the many others who have made us a popular read in our Amateur community.

Don't forget to click on the Internet links throughout this publication for even more information.

~ John VE7TI
Editor



This Month's Issue...

The Brodie grandkids (with one addition) illustrate the changing face of Ham radio in photos taken several years apart. We have several stories and opinions of how Ham radio has changed over the years, and much more to keep you busy as we ride out the pandemic.

Change is the law of life—John F. Kennedy

On the Web ve7sar.net

Between newsletters, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

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The Rest Of The Story...

Antonio Santi Giuseppe Meucci

The Real Inventor of the Telephone?



**Antonio Santi
Giuseppe Meucci**

Antonio Santi Giuseppe Meucci (13 April 1808 - 18 October 1889) was an Italian inventor and an associate of Giuseppe Garibaldi, a major political figure in the history of Italy. Meucci is best known for developing a voice-communication apparatus that several sources credit as the first telephone.

Meucci set up a form of voice-communication link in his Staten Island, New York, home that connected the second-floor bedroom to his laboratory. He submitted a patent caveat for his telephonic device to the U.S. Patent Office in 1871, but there was no mention of electromagnetic transmission of vocal sound in his caveat. In 1876, Alexander Graham Bell was granted a patent for the electromagnetic transmission of vocal sound by undulatory electric current.

Despite the longstanding general crediting of Bell with the accomplishment, the Italian Ministry of Cultural Heritage and Activities supported celebrations of Meucci's 200th birthday in 2008 using the title "Inventore del telefono" (Inventor of the telephone). The U.S. House of Representatives also honored Meucci in a resolution in 2002 for having had some role in the development of the telephone, although the U.S. Senate did not join the resolution and the interpretation of the resolution is disputed.

Early life

Meucci was born in the San Frediano borough of Florence, Grand Duchy of Tuscany (now in the Italian Republic), on 13 April 1808, as the first of nine children to Amatis Meucci and Domenica Pepi. Amatis was at times a government clerk and a member of the local police, and Domenica was principally a homemaker. Four of Meucci's siblings did not survive childhood.

In November 1821, at the age of 13, he was admitted to Florence Academy of Fine Arts as its youngest student, where he studied chemical and mechanical engineering. He ceased full-time studies two years later due to insufficient funds, but continued studying part-time after obtaining employment as an assistant gatekeeper and customs official for the Florentine government.

In May 1825, because of the celebrations for the childbirth of Marie Anna of Saxony, wife of Leopold II Grand Duke of Tuscany, he conceived a powerful propellant mixture for flares. Unfortunately the fireworks went out of Meucci's control causing damages and injuries in the celebration's square. Meucci was arrested and suspected of conspiracy against the Grand Duchy.

Meucci later became employed at the Teatro della Pergola in Florence as a stage technician, assisting Artemio Canovetti.

In 1834 Meucci constructed a type of acoustic telephone to communicate between the stage and control room at the Teatro of Pergola. This telephone was constructed on the principles of pipe-telephones used on ships and still functions. He married costume designer Esterre Mochi, who was employed in the same theatre, on 7 August 1834.

Move to Havana, Cuba

In October 1835, Meucci and his wife emigrated to Cuba, then a Spanish province, where Meucci accepted a job at what was then called the Teatro Tacón in Havana (at the time, the greatest theater in the Americas). In Havana he constructed a system for water purification and reconstructed the Gran Teatro.

In 1848 his contract with the governor expired. Meucci was asked by a friend's doctors to work on Franz Anton Mesmer's therapy system on patients suffering from rheumatism. In 1849, he developed a popular method of using electric shocks to treat illness and subsequently experimentally developed a device through which one could hear inarticulate human voice. He called this device "telegrafo parlante" (talking telegraph).

In 1850, the third renewal of Meucci's contract with Don Francisco Martí y Torrens expired, and his friendship with General Giuseppe Garibaldi made him a suspect citizen in Cuba. On the other hand, the fame reached by Samuel F. B. Morse in the United States encouraged Meucci to make his living through inventions.

Move to Staten Island, New York

On 13 April 1850, Meucci and his wife emigrated to the United States, taking with them approximately 26,000 pesos fuertes in savings (approximately \$500,000 in 2010 dollars), and settled in the Clifton area of Staten Island, New York.

The Meuccis would live there for the remainder of their lives. On Staten Island he helped several countrymen committed to the Italian unification movement and who had escaped political persecution. Meucci invested the substantial capital he had earned in Cuba into a tallow candle factory (the first of this kind in America) employing several Italian exiles. For two years

Meucci hosted friends at his cottage, including General Giuseppe Garibaldi, and Colonel Paolo Bovi Campeggi, who arrived in New York two months after Meucci. They worked in Meucci's factory.

In 1854, Meucci's wife Esterre became an invalid due to rheumatoid arthritis. Meucci continued his experiments.

Electromagnetic telephone

Meucci studied the principles of electromagnetic voice transmission for many years and was able to transmit his voice through wires in 1856. He installed a telephone-like device within his house in order to communicate with his wife who was ill at the time. Some of Meucci's notes written in 1857 describe the basic principle of electromagnetic voice transmission or in other words, the telephone:

Consiste in un diaframma vibrante e in un magnete elettrizzato da un filo a spirale che lo avvolge. Vibrando, il diaframma altera la corrente del magnete. Queste alterazioni di corrente, trasmesse all'altro capo del filo, imprimono analoghe vibrazioni al diaframma ricevente e riproducono la parola.

Translated:

It consists of a vibrating diaphragm and an electrified magnet with a spiral wire that wraps around it. The vibrating diaphragm alters the current of the magnet. These alterations of current, transmitted to the other end of the wire, create analogous vibrations of the receiving diaphragm and reproduce the word.

Meucci devised an electromagnetic telephone as a way of connecting his second-floor bedroom to his basement laboratory, and thus being able to communicate with his wife. Between 1856 and 1870, Meucci developed more than 30 different kinds of telephones on the basis of this prototype.

A postage stamp was produced in Italy in 2003 that featured a portrait of Meucci. Around 1858, artist Nestore Corradi sketched Meucci's communication concept. His drawing was used to accompany the stamp in a commemorative publication of the Italian Postal and Telegraph Society.

Meucci intended to develop his prototype but did not have the financial means to keep his company afloat in order to finance his invention. His candle factory went bankrupt and Meucci was forced to unsuccessfully seek funds from rich Italian families. In 1860, he asked his friend Enrico Bandelari to look for Italian capitalists willing to finance his project. However, military expeditions led by Garibaldi in Italy had made the political situation in that country too unstable for anybody to invest.

Bankruptcy

At the same time, Meucci was led to poverty by some fraudulent debtors. On 13 November 1861 his cottage was auctioned. The purchaser allowed the Meuccis to live in the cottage without paying rent, but Meucci's private finances dwindled and he soon had to live on public funds and by depending on his friends. As mentioned in William J. Wallace's ruling, during the years 1859-1861, Meucci was in close business and social relations with William E. Ryder, who invested money in Meucci's inventions and paid the expenses of his experiments. Their close working friendship continued until 1867.

In August 1870, Meucci reportedly was able to capture a transmission of articulated human voice at the distance of a mile by using a copper plate as a conductor, insulated by cotton. He called this device the "telettrofono". While he was recovering from injuries that befell him in a boiler explosion aboard a Staten Island ferry, the Westfield, Meucci's financial and health state was so bad that his wife sold his drawings and devices to a second-hand dealer to raise money.

Analysis of Meucci's caveat

Meucci repeatedly focused on insulating the electrical conductor and even insulating the people communicating, but does not explain why this would be desirable. The mouth piece is like a "speaking trumpet" so that "the sound concentrated upon the wire" is communicated to the other person, but he does not say that the sound is converted to variable electrical conduction in the wire. "Another instrument is also applied to the ears," but he does not say that variable electrical conduction in the wire is to be converted to sound. In the third claim, he claims "a sound conductor which is also an electrical conductor, as a means of communication by

sound" which is consistent with acoustic sound vibrations in the wire that somehow get transmitted better if electrical conductors such as a wire or metallic tube are used."

Meucci emphasizes that the conductors "for mouth and ears ... must be metallic", but does not explain why this would be desirable. He mentions "communication with the ground" but does not suggest that a ground return must complete a circuit if only "the wire" (singular, not plural) is used between the sender's mouth piece and the receiver's ear piece, with one or the other person being electrically insulated from the ground by means of glass insulators ("... consists in isolating two persons ... by placing them upon glass insulators; employing glass, for example, at the foot of the chair or bench on which each sits, and putting them in communication by means of a telegraph wire").

Robert V. Bruce, a biographer of Bell, asserted that Meucci's caveat could never have become a patent because it never described an electric telephone.

The conflicting opinions of Meucci biographers

According to Robert V. Bruce, Meucci's own testimony as presented by Schiavo would demonstrate that the Italian inventor did not understand the basic principles of the electric telephone, either before Bell patented it, or for several years after Bell patented it.

Other researchers have pointed to inconsistencies and inaccuracies in Bruce's account of the invention of the telephone, firstly with the name used by Meucci to describe his invention—Bruce referred to Meucci's device as a 'telephone', not as the 'telettrofono'. Bruce's reporting of Meucci's purported relationship with Dr. Seth R. Beckwith has been deemed inaccurate; Meucci and his legal representative had cautioned Beckwith against misusing Meucci's name for financial gain, vis-à-vis the company Beckwith founded in New Jersey.

Not only did Beckwith's Globe Telephone Co. base its claims against the Bell Telephone Company on Meucci's caveat, but the claims were also supported by approximately 30 affidavits, which stated that Meucci had repeatedly built and used different types of electric telephones several years before Bell did.

English historian William Aitken does not share Robert V. Bruce's viewpoint. Bruce had indirectly referred to Meucci as "the silliest and weakest impostor", while Aitken went so far as to define Meucci as the first creator of an electrical telephone.

Other recognition of Meucci's work in the past came from the International Telecommunication Union, positing that Meucci's work was one of the four precursors to Bell's telephone, as well as from the Smithsonian Institution, which listed Meucci as one of the eight most important inventors of the telephone in a 1976 exhibit.

Meucci and his business partners hired an attorney (J. D. Stetson), who filed a caveat on behalf of Meucci with the patent office. They had wanted to prepare a patent application, but the partners did not provide the \$250 fee, so all that was prepared was a caveat, since the fee for that was only \$20. However, the caveat did not contain a clear description of how the asserted invention would actually function. Meucci advocates claim the attorney erased margin notes Meucci had added to the document.

Telettrofono Company

In 1872, Meucci and his friend Angelo Bertolino went to Edward B. Grant, Vice President of American District Telegraph Co. of New York (not Western Union as sometimes stated), to ask for help. Meucci asked him for permission to test his apparatus on the company's telegraph lines. He gave Grant a description of his prototype and a copy of his caveat. After waiting two years, Meucci went to Grant and asked for his documents back, but Grant allegedly told him they had been lost.

Around 1873, a man named Bill Carroll from Boston, who had news about Meucci's invention, asked him to construct a telephone for divers. This device should allow divers to communicate with people on the surface. In Meucci's drawing, this device is essentially an electromagnetic telephone encapsulated to be waterproof.

On 28 December 1874, Meucci's Telettrofono patent caveat expired. Critics dispute the claim that Meucci could not afford to file for a patent or renew his caveat, as he filed for and was granted full patents in 1872, 1873, 1875, and 1876, at the cost of \$35 each, as well as one additional \$10 patent caveat, all totaling \$150, for inventions unrelated to the telephone.

After Bell secured his patents in 1876 and subsequent years, the Bell Telephone Company filed suit in court against the Globe Telephone Company (amongst many others) for patent infringement. Purportedly too poor to hire a legal team, Meucci was represented only by lawyer Joe Melli, an orphan whom Meucci treated as his own son. While *American Bell Telephone Company v. Globe Telephone Company, Antonio Meucci, et al.* was still proceeding, Bell also became involved with *The U.S. Government v. American Bell Telephone Company*, instigated by the Pan-Electric Telephone Company, which had secretly given the U.S. Attorney General 10% of its shares, employed him as a director, and then asked him to void Bell's patent. Had he succeeded in overturning Bell's patent, the U.S. Attorney General stood to become exceedingly rich by reason of his shares.

Trial

The Havana experiments were briefly mentioned in a letter by Meucci, published by *Il Commercio di Genova* of 1 December 1865 and by *L'Eco d'Italia* of 21 October 1865 (both existing today).

An important pieces of evidence brought up in the trial was Meucci's Memorandum Book, which contained Meucci's noted drawings and records between 1862 and 1882. In the trial, Antonio Meucci was accused of having produced records after Bell's invention and back-dated them. As proof, the prosecutor brought forward the fact that the Rider & Clark company was founded only in 1863. At trial, Meucci said William E. Rider himself, one of the owners, had given him a copy of the memorandum book in 1862; however, Meucci was not believed.

On 13 January 1887, the United States Government moved to annul the patent issued to Bell on the grounds of fraud and misrepresentation. After a series of decisions and reversals, the Bell company won a decision in the Supreme Court, though a couple of the original claims from the lower court cases were left undecided. By the time that the trial wound its way through nine years of legal battles, the U.S. prosecuting attorney had died and the two Bell patents (No. 174,465 dated 7 March 1876 and No. 186,787 dated 30 January 1877) were no longer in effect, although the presiding judges



Meucci's
telephone

agreed to continue the proceedings due to the case's importance as a "precedent".

With a change in administration and charges of conflict of interest (on both sides) arising from the original trial, the U.S. Attorney General dropped the lawsuit on 30 November 1897 leaving several issues undecided on the merits. During a deposition filed for the 1887 trial, Meucci claimed to have created the first working model of a telephone in Italy in 1834. In 1886, in the first of three cases in which he was involved, Meucci took the stand as a witness in the hopes of establishing his invention's priority. Meucci's evidence in this case was disputed due to lack of material evidence of his inventions as his working models were reportedly lost at the laboratory of American District Telegraph (ADT) of New York. ADT did not merge with Western Union to become its subsidiary until 1901.

Meucci's patent caveat had described a lover's telegraph, which transmitted sound vibrations mechanically across a taut wire, a conclusion that was also noted in various reviews ("The court further held that the caveat of Meucci did not describe any elements of an electric speaking telephone ...", and "The court held that Meucci's device consisted of a mechanical telephone consisting of a mouthpiece and an earpiece connected by a wire, and that beyond this the invention of Meucci was only imagination.") Meucci's work, like many other inventors of the period, was based on earlier acoustic principles and despite evidence of earlier experiments, the final case involving Meucci was eventually dropped upon his death.

Some of Meucci's Other Inventions

Meucci was a prolific inventor. Here are some of his inventions and patents...

- 1856 First lager beer factory of Staten Island, the Clifton Brewery, in Clifton, NY.
- 1844 First electroplating factory of the Americas, set up in Havana, Cuba. Previously, objects to be electroplated were sent to Paris.
- 1847 Restructuring of the Tacón Theater in Havana, following a hurricane. Meucci conceived a new structure of the roof and ventilation system, to avoid the roof to be taken off in like situations.

- 1849 Chemical process for the preservation of corpses, to cope with the high demand for bodies of immigrants to be sent to Europe, avoiding decomposition during the many weeks navigation.
- 1862 US Patent No. 36,192 on a kerosene lamp that generates a very bright flame, without smoke
- 1862-63 Process for treating and bleaching oil or kerosene to obtain siccative oils for paint
- 1864 Invention of new, more destructive ammunition for guns and cannons, proposed to the US army and to General Giuseppe Garibaldi.
- 1864-65 Processes to obtain paper pulp from wood or other vegetable substances
- 1876 US Patent No. 183,062 "Hygrometer," which was a marked improvement over the popular hair-hygrometer of the time. He set up a small factory in Staten Island for fabrication of the same.
- 1878 Method for preventing noise on elevated railways, a problem much felt at the time in New York.
- 1878 Process for fabricating ornamental paraffin candles for Christmas trees.
- 1880 US patent application "Wire for Electrical Purposes"
- 1881 Process for making postage and revenue stamps.
- 1883 US Patent No. 279,492 "Plastic Paste," as hard and tenacious to be suitable for billiard balls.

Death

Meucci became ill in March 1889, and died on 18 October 1889 in Clifton, Staten Island, New York.

And that is the rest of his story.

~

Invention of the Telephone

The question of whether Bell was the true inventor of the telephone is perhaps the single most litigated fact in U.S. history

There has been much dispute over who deserves recognition as the first inventor of the telephone, although Bell was credited with being the first to transmit articulate speech by undulatory currents of electricity. The Federazione Italiana di Elettrotecnica has devoted a museum to Meucci making a chronology of his inventing the telephone and tracing the history of the two trials opposing Meucci and Bell. They support the claim that Antonio Meucci was the real inventor of the telephone.

However, some scholars outside Italy do not recognize the claims that Meucci's device had any bearing on the development of the telephone. Tomas Farley also writes that, "Nearly every scholar agrees that Bell and Watson were the first to transmit intelligible speech by electrical means. Others transmitted a sound or a click or a buzz but our boys [Bell and Watson] were the first to transmit speech one could understand."

In 1834 Meucci constructed a kind of acoustic telephone as a way to communicate between the stage and control room at the theatre "Teatro della Pergola" in Florence. This telephone was constructed on the model of pipe-telephones on ships and is still functional.

In 1848 Meucci developed a popular method of using electric shocks to treat rheumatism. He used to give his patients two conductors linked to 60 Bunsen batteries and ending with a cork. He also kept two conductors linked to the same Bunsen batteries. He used to sit in his laboratory, while the Bunsen batteries were placed in a second room and his patients in a third room. In 1849 while providing a treatment to a patient with a 114V electrical discharge, in his laboratory Meucci is claimed to have heard

his patient's scream through the piece of copper wire that was between them, from the conductors he was keeping near his ear. His intuition was that the "tongue" of copper wire vibrated just like a leave of an electroscope—which meant there was an electrostatic effect. To continue the experiment without hurting his patient, Meucci covered the copper wire with a piece of paper. Through this device he claimed to hear an unarticulated human voice. He called this device "telegrafo parlante" (talking telegraph).

On the basis of this prototype, some claim Meucci worked on more than 30 kinds of telephones. In the beginning, he was inspired by the telegraph. Different from other pioneers of the telephone—such as Charles Bourseul, Philipp Reis, Innocenzo Manzetti, and others—he did not think about transmitting voice by using the principle of the telegraph key (in scientific jargon, the "make-and-break" method). Instead, he looked for a "continuous" solution, meaning one that didn't interrupt the electric flux. In 1856, Meucci reportedly constructed the first electromagnetic telephone, made of an electromagnet with a nucleus in the shape of a horseshoe bat, a diaphragm of animal skin, stiffened with potassium dichromate and a metal disk stuck in the middle. The instrument was housed in a cylindrical carton box. He purportedly constructed it to connect his second-floor bedroom to his basement laboratory, and thus communicate with his invalid wife.

Meucci separated the two directions of transmission to eliminate the so-called "local effect"—using what we would call today a four-wire-circuit. He constructed a simple calling system with a telegraphic manipulator that short-circuited the instrument of the calling

person to make a succession of impulses (clicks) that were louder than normal conversation. Aware that his device required a bigger band than a telegraph, he found some means to avoid the so-called "skin effect" through superficial treatment of the conductor or by acting on the material (copper instead of iron).

In 1864, Meucci claimed to have made what he felt was his best device, using an iron diaphragm with optimized thickness and tightly clamped along its rim. The instrument was housed in a shaving-soap box, whose cover clamped the diaphragm. In August 1870, Meucci reportedly obtained transmission of articulate human voice at a mile distance by using as a conductor a copper wire insulated by cotton. He called his device "telettrofono". Drawings and notes by Antonio Meucci with a claimed date of 27 September 1870 show that Meucci understood inductive loading on long distance telephone lines 30 years before any other scientists. The question of whether Bell was the true inventor of the telephone is perhaps the single most litigated fact in U.S. history, and the Bell patents were defended in some 600 cases. Meucci was a defendant in *American Bell Telephone Co. v. Globe Telephone Co. and others* (the court's findings, reported in 31 Fed. Rep. 729).

N. Herbert in his History of the Telephone said:

To bait the Bell Company became almost a national sport. Any sort of claimant, with any sort of wild tale of prior invention, could find a speculator to support him. 'On they came, a motley array, some in rags, some on nags, and some in velvet gowns.' One of them claimed to have done wonders with an iron hoop and a file in 1867; a second had a marvelous table with glass legs; a third swore that he had made a telephone in 1860, but did not know what it was until he saw Bell's patent; and a fourth told a vivid story of having heard a bullfrog croak via a telegraph wire which was strung into a certain cellar in Racine, in 1851.

Judge Wallace's ruling was bitterly regarded by historian Giovanni Schiavo as a miscarriage of justice.



2002 U.S. Congressional resolution

In 2002, on the initiative of U.S. Representative Vito Fossella (R-NY), in cooperation with an Italian-American deputation, the U.S. House of Representatives passed United States HRes. 269 on Antonio Meucci stating "that the life and achievements of Antonio Meucci should be recognized, and his work in the invention of the telephone should be acknowledged." According to the preamble, "if Meucci had been able to pay the \$10 fee to maintain the caveat after 1874, no patent could have been issued to Bell." The resolution's sponsor described it as "a message that rings loud and clear recognizing the true inventor of the telephone, Antonio Meucci."

In 2002, some news articles reported that "the resolution said his 'telettrofono', demonstrated in New York in 1860, made him the inventor of the telephone in the place of Bell, who took out a patent 16 years later."

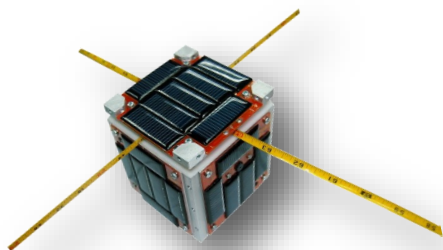
A similar resolution was introduced to the U.S. Senate but no vote was held on the resolution.

Despite the House of Representatives resolution, its interpretation as supporting Meucci's claim as the inventor of the telephone remains disputed, as the resolution only referred to "his work in the invention of" the telephone rather than a direct assertion that he was the inventor of the telephone.

The House of Commons of Canada responded ten days later by unanimously passing a parliamentary motion stating that Alexander Graham Bell was the inventor of the telephone.

The Italian newspaper La Repubblica hailed the vote to recognize Meucci as a belated comeuppance for Bell.

The Order of the Sons of Italy in America maintains a Garibaldi-Meucci Museum [photo left] on Staten Island. The museum is located in a house that was built in 1840, purchased by Meucci in 1850, and rented to Giuseppe Garibaldi from 1850 to 1854. Exhibits include Meucci's models and drawing and pictures relating to his life.



Satellite News

First Element of ARISS Next Generation Radio System Installed in ISS Columbus Module

The ARISS team is pleased to announce that set up and installation of the first element of our next generation radio system was completed and amateur radio operations with it are now underway. This first element, dubbed the InterOperable Radio System (IORS), was installed in the International Space Station Columbus module. The IORS replaces the Ericsson radio system and packet module that were originally certified for spaceflight on July 26, 2000.

Initial operation of the new radio system is in FM cross band repeater mode using an uplink frequency of 145.99 MHz with an access tone of 67 Hz and a downlink frequency of 437.800 MHz. System activation was first observed at 01:02 UTC on September 2. Special operations will continue to be announced.

The IORS was launched from Kennedy Space Center on March 6, 2020 on board the SpaceX CRS-20 resupply mission. It consists of a special, space-modified JVC

Kenwood D710GA transceiver, an ARISS developed multi-voltage power supply and interconnecting cables. The design, development, fabrication, testing, and launch of the first IORS was an incredible five-year engineering achievement accomplished by the ARISS hardware volunteer team. It will enable new, exciting capabilities for ham radio operators, students, and the general public. Capabilities include a higher power radio, voice repeater, digital packet radio (APRS) capabilities and a Kenwood VC-H1 slow scan television (SSTV) system.

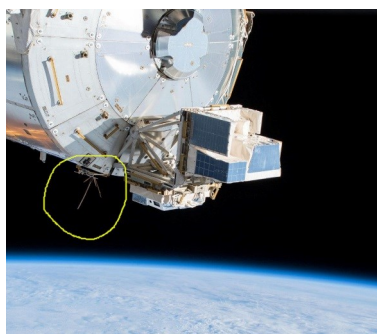
A second IORS undergoes flight certification and will be launched later for installation in the Russian Service module. This second system enables dual, simultaneous operations, (e.g. voice repeater and APRS packet), providing diverse opportunities for radio amateurs. It also provides on-orbit redundancy to ensure continuous operations in the event of an IORS component failure.

Next-gen development efforts continue. For the IORS, parts are being procured and a total of ten systems are being fabricated to support flight, additional

A Kenwood D710GA transceiver is now in operation as a cross-band repeater on the iSS



ARISS
Amateur Radio on the International Space Station



The ARISS antenna on the ISS. It's a 2m/70cm dual band whip

flight spares, ground testing and astronaut training. Follow-on next generation radio system elements include an L-band repeater uplink capability, currently in development, and a flight Raspberry-Pi, dubbed "ARISS-Pi," that is just beginning the design phase. The ARISS-Pi promises operations autonomy and enhanced SSTV operations.

ARISS is run almost entirely by volunteers, and with the help of generous contributions from ARISS sponsors and individuals. Donations to the ARISS program for next generation hardware developments, operations, education, and administration are welcome -- please go to <https://www.ariss.org/donate.html> to contribute to these efforts.

ARISS--Celebrating 20 years of continuous amateur radio operations on the ISS!

Amateur Radio on the International Space Station (ARISS) is a cooperative venture of international amateur radio societies

and the space agencies that support the International Space Station (ISS). In the United States, sponsors are the Radio Amateur Satellite Corporation (AMSAT), the American Radio Relay League (ARRL), the ISS National Lab-Space Station Explorers, and NASA's Space Communications and Navigation program. The primary goal of ARISS is to promote exploration of science, technology, engineering, the arts, and mathematics topics by organizing scheduled contacts via amateur radio between crew members aboard the ISS and students. Before and during these radio contacts, students, educators, parents, and communities learn about space, space technologies, and amateur radio. For more information, see www.ariss.org.

~ Dave Jordan, AA4KN
ARISS PR

Two more astronauts earn Amateur Radio licenses

Although the lockdown of Johnson Space Center (JSC) postponed Amateur Radio training and licensing over the past seven months, NASA ISS Ham Project Coordinator Kenneth Ransom, N5VHO, was able to work with all of the new astronaut-class graduates, as well as offer some refresher courses with already-licensed astronauts.

Licensed astronauts on the International Space Station (ISS) may operate the on-station ham radio equipment without restrictions. Astronauts often participate in Amateur Radio on the International Space Station (ARISS) contacts with schools and groups on Earth.

NASA Astronaut Kayla Barron, who completed her introductory course in June and received basic ham radio operations training in late September, recently tested and received the call sign KI5LAL.

European Space Agency astronaut Matthias Maurer passed his Amateur Radio exam on July 30, and he got his basic ham operations training in July. He now is KI5KFH.

Astronauts Shane Kimbrough, KE5HOD, and Shannon Walker, KD5DXB, completed the refresher course earlier this year. Two other new astronauts are in the queue to take the Technician license exam.

~ ANS, ARRL and Rosalie White, K1STO

Page 13—News You Can Lose

The Lighter Side of Amateur Radio

DXORCISM RIDS STATION OF SPOOKS!



By K5KVN, on the scene

SIMI VALLEY, Calif. — Traffic along Hillshire Avenue came to a halt yesterday as curious drivers stopped to see Father Henry McGuire suspended high above the Cuesta Verde neighborhood in a scissor lift.

Local ham radio operator Malcolm O'Hara arranged the spectacle, after experiencing phenomena that led him to determine his equipment was possessed.

O'Hara asked Father McGuire to "drive out the demons" that have prevented him from talking to distant amateur radio stations. The pair dubbed the activity a "DXorcism," which involved throwing holy water on a Rohn tower and a Cushcraft beam antenna.

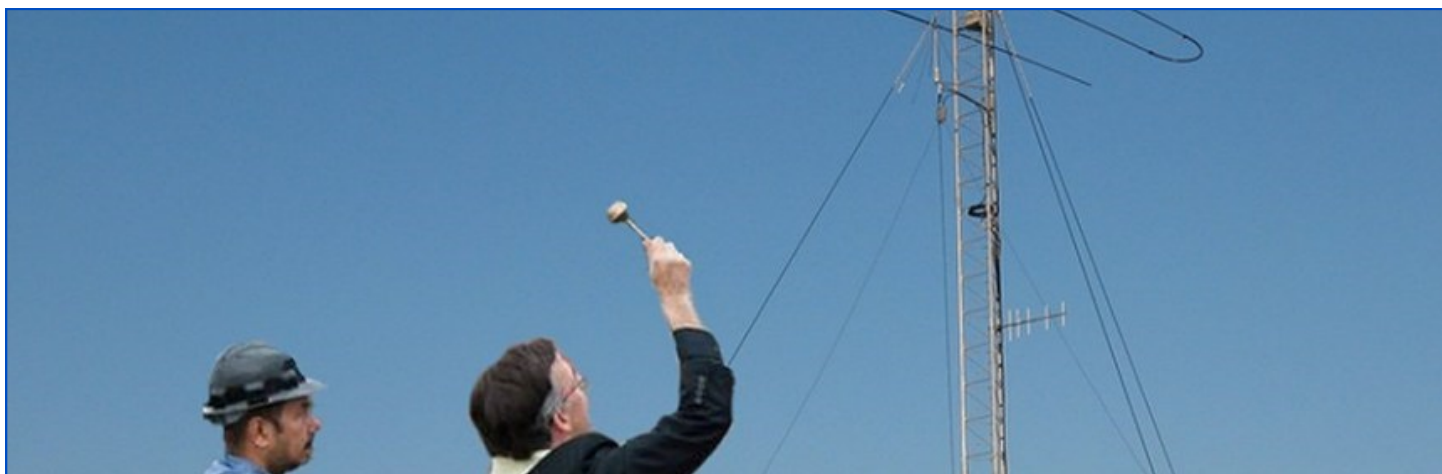
"Trust me, this was a last resort," said O'Hara. "Finding pea soup in my cantenna was the last straw."

He says strange occurrences have been happening in his shack for more than a year. "My beam turns all by itself! My buddies say it's an electrical wiring problem, but I know it's paranormal."

"And, last week I was trying to work some RTTY, expecting a 599 signal report, but the screen printed 666. My wife says I need glasses, but it really freaked me out," said O'Hara.

He says he's not ready yet to call the procedure a success. His first contact following the DXorcism was a special event station in Death Valley.

~ HamHijinks.com



Our cover story...

The changing face of amateur radio



The History of Radio in Canada

Radio was introduced in Canada in the late 1890s, although initially transmissions were limited to the dot-and-dashes of Morse code, and primarily used for point-to-point services, especially for maritime communication. The history of broadcasting in Canada dates to the early 1920s, as part of the worldwide development of radio stations sending information and entertainment programming to the general public. Television was introduced in the 1950s, and soon became the primary broadcasting service.

From the late 1890s until 1913 there were few regulations covering radio communication in Canada. The earliest stations were only capable of transmitting Morse code; despite this limitation as early as May 1907 the Marconi station at Camperdown, Nova Scotia began broadcasting time signals on a regular schedule.

The Radiotelegraph Act of June 6, 1913 established general Canadian policies for radio communication, then commonly known as "wireless telegraphy". Similar to the law in force in Britain, this act required that operation of "any radiotelegraph apparatus" required a licence, issued by the Minister of the Naval Service. This included members of the general public who only possessed a radio receiver and were not making transmissions, who were required to hold an "Amateur Experimental Station" licence, as well as pass the exam needed to receive an "Amateur Experimental Certificate of Proficiency", which required the ability to send and receive Morse code at five words a minute. (This policy contrasted with the United States, which only required licenses for operating transmitters, and

had no restrictions or taxes on individuals only using receivers).

With its entrance into World War I in August 1914, Canada generally banned the civilian use of radio receivers and transmitters. This restriction remained in force until 1 May 1919. Radio regulation remained under the oversight of the Department of Naval Service until July 1, 1922, when it was transferred to civilian control under the Department of Marine and Fisheries.

During World War I, advances in vacuum tube technology made audio transmissions practical. There was no formal category of radio stations providing entertainment broadcasts intended for the general public until April 1922, so the earliest Canadian stations making broadcasts operated under a mixture of Experimental, Amateur, and governmental authorizations.

Information about the earliest experimental broadcasts is limited. One pioneer was William Walter Westover Grant, who served in the British Royal Air in France during World War I, where he gained extensive experience installing and maintaining radio equipment. After the war ended, he returned to Canada where reportedly in May 1919 he "constructed a small station in Halifax, Nova Scotia, over which voice and music were broadcast in probably the first scheduled programs in Canada". In 1920 Grant began working for the Canadian Air Board's Forestry patrol, developing air-to-ground communication for the spotter aircraft used to report forest fires, initially using radiotelegraphy. The original base was located at Morley, Alberta, where Grant constructed station CYAA.

Early Broadcast Radio

In January 1921 operations moved to the High River Air Station in southern Alberta, where Grant established station VAW, which was capable of audio transmissions. In addition to the forestry work Grant began making a series of experimental entertainment broadcasts, believed to be the first in western Canada. Grant left the forestry project and established the W. W. Grant Radio, Ltd. in Calgary, which on May 18, 1922 was issued the city's third commercial broadcasting station license, with the randomly assigned call letters CFCN (now CKMX).

A better known example was a Montreal station, which was first licensed sometime between April 1, 1914 and March 31, 1915 as experimental station XWA to the Marconi Wireless Telegraph Company of Canada, Ltd. ("Canadian Marconi"), and was one of the few civilian stations allowed to continue operating during World War I, when it was used to conduct military research. At first it only transmitted Morse code, however during the spring of 1919 employee Arthur Runciman began a series of voice tests, although initially the equipment was promoted as being useful for point-to-point communication rather than broadcasting. In early 1919, parent company British Marconi shipped a surplus 500-watt transmitter to Montreal for evaluation. As was common at a number of early stations, the engineers soon tired of having to repetitively speak for the test transmissions, and began to play phonograph records, which drew the attention of local amateur radio operators. The first documented broadcast of entertainment by XWA to a general audience occurred on the evening of May 20, 1920, when a concert was prepared for a Royal Society of Canada audience listening 110 miles (175 kilometers) away at the Château Laurier in the capital city of Ottawa. XWA eventually began operating on a regular schedule, at first run almost single-handedly by Douglas "Darby" Coats. Sometime in 1921 the station's call sign was changed to "9AM", reflecting a policy change in the call signs issued to experimental stations, and a short notice in the November 1921 issue of QST magazine reported that it was now broadcasting once a week on Tuesdays starting

at 8 p.m. In April 1922, the station received a commercial broadcasting station license with the randomly assigned call letters of CFCF, and it later adopted the slogan of "Canada's First". This station was deleted, as CINW, in 2010.

In addition to the developing experimental broadcasts taking place in Canada, some American stations, especially at night, could easily be received in the heavily populated parts of Canada.

The Canadian National Railway Company (CNR) became interested in radio broadcasting in 1923, due in large part to the leadership of its president, Sir Henry Thornton. That year it began equipping its trains with radio receivers to allow passengers to hear radio broadcasts. In 1924, CNR began building its own stations, and by 1928 it had created Canada's first national network, CNR Radio (officially the Canadian National Railways Radio Department), developed, owned and operated by CNR to provide en route entertainment and information for its passengers. As broadcasts could be received by anyone living in the coverage area of station transmitters, the network provided radio programming to Canadians from the Pacific coast at Vancouver to the Atlantic coast at Halifax.

THIS LICENSE **MUST** BE KEPT ON STATION AND AVAILABLE FOR INSPECTION
CETTE LICENCE **DOIT** ACCOMPAGNER L'APPAREIL RADIOÉMETTEUR ET ÊTRE DISPONIBLE POUR INSPECTION

DEPARTMENT OF TRANSPORT RADIO DIVISION **1948-49** MINISTÈRE DES TRANSPORTS DIVISION DE LA RADIO

Special Private Receiving Station Licence
(Issued in accordance with the provisions of The Radio Act, 1938, and the Regulations made thereunder.)
Licence Spéciale de Poste Radiorécepteur Privé
(Délivrée conformément aux dispositions de la Loi sur la Radio, 1938, et des Règlements établis sous son empire.)

X 11271

Mr. William John Campbell
(Christian Name in full) (Prénom au long)
PRINT IN BLOCK LETTERS (Surnom)
ÉCRIRE EN CARACTÈRES D'IMPRIMERIE (Nom de famille)

London (City or Town) (Ville ou village)
York (County) (Comté)
ON (Province)

IS HEREBY LICENSED, SUBJECT TO THE CONDITIONS SET FORTH ON THE BACK HEREOF, TO ESTABLISH A PRIVATE RECEIVING STATION AND/OR TO OPERATE ONE OR MORE BATTERY OPERATED RADIO RECEIVING SETS INSTALLED IN THE SAID STATION, AND INTENDED SOLELY FOR AND CAPABLE OF RECEIVING BROADCASTING, AT THE ABOVE ADDRESS PROVIDED THE SAID ADDRESS IS LOCATED IN AN AREA NOT SERVED BY AN ELECTRIC DISTRIBUTION SYSTEM.

EST PAR LA PRESENTE LICENCE, AUTORISÉ À ÉTABLIR UN POSTE RADIORECEPTEUR PRIVÉ ET/OU METTRE EN SERVICE UN OU PLUSIEURS APPAREILS RADIORECEPTEURS FONCTIONNANT AU MOYEN DE PILES INSTALLÉS DANS LEDIT POSTE, EXCLUSIVEMENT DESTINÉS ET PROPRES À RECEVOIR LA RADIODIFFUSION, À L'ADRESSE CI-DESSUS, POURVU QUE LEDIT ADRESSE SOIT DANS UNE RÉGION NON DESERVIE PAR UN RÉSEAU DE DISTRIBUTION D'ÉLECTRICITÉ.

THIS LICENSE EXPIRES ON THE 31st MARCH, 1949. - CETTE LICENCE EXPIRE LE 31 MARS 1949.

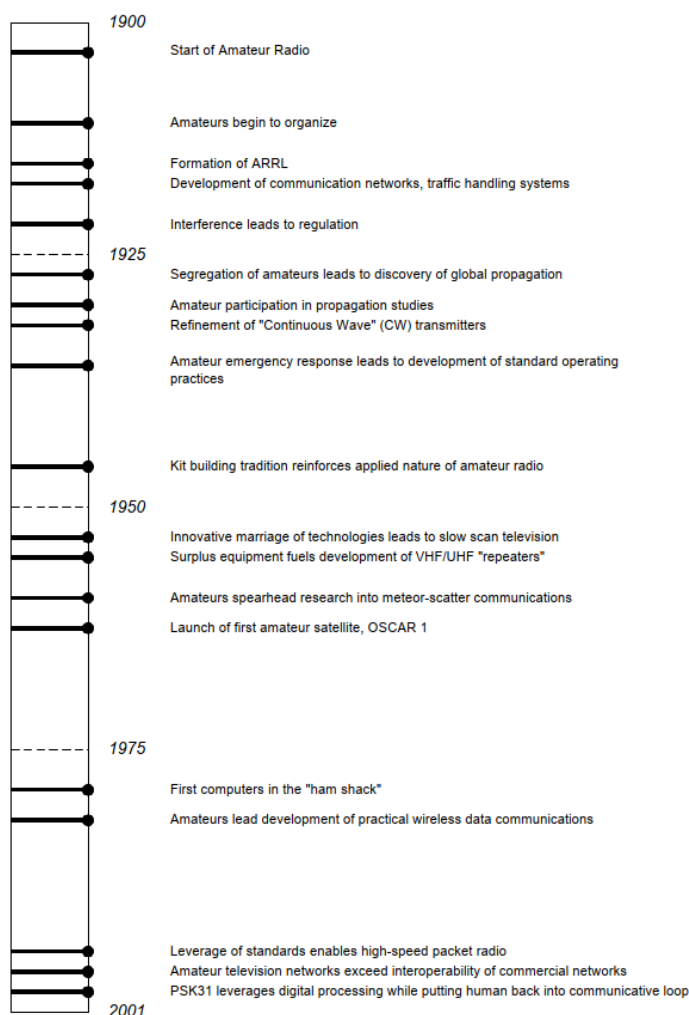
RECEIVED THE SUM OF TWO DOLLARS (\$2.00), LICENSE FEE, THIS 31st DAY OF July A.D. 1948.

REÇU LA SOMME DE DEUX DOLLARS (\$2.00), REDEVANCE DUE, CE 31 JOUR DE Juillet A.D. 1948.

ISSUED ON BEHALF OF THE MINISTER OF RECONSTRUCTION AND SUPPLY
ÉMISE AU NOM DU MINISTRE DE LA RECONSTRUCTION ET DES APPROVISIONNEMENTS

Form 2031 To be handed to Licensee—À remettre au titulaire

During its nine-year existence, CNR Radio provided music, sports, information and drama programming to Canadians. Programs were produced in English, French and occasionally in some First Nations languages, and distributed nationwide through the railway's own telegraph lines and through rented airtime on private radio stations. However, political and competitive pressure forced CNR Radio to close, with many of its assets and personnel migrating to a new government-operated agency, the Canadian Radio Broadcasting Commission (CRBC).



Amateur Radio in Canada^[1]

Amateur radio in Canada began in the early 1900s. The activity was formally addressed by the federal (then Dominion) government in subsection 6 of the Wireless Telegraphy Act of 1905:

"Where the applicant for a licence proves to the satisfaction of the Minister that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted, subject to such special terms, condition, and restrictions as the Minister thinks proper" (Bird 1988 #38, "The Wireless Telegraph Act").

Regulations governing amateur licensing were first stipulated in the Radiotelegraph Act of 1913^[2] (Bird 1988 #38, "The Radiotelegraph Act"). The qualifying examination for amateur radio operators at this time consisted of an inspection of the applicant's station, and a test of his/her ability to send and receive Morse code at the relatively slow rate of five words per minute. A written examination was introduced in the early 1920s that tested the applicant's technical knowledge of radio. In the 1930s, as the body of knowledge on radio technology grew, prospective amateurs were also required to draw, from memory, schematic diagrams of transmitters and receivers. The Morse code standard was increased at this time to ten words per minute (Department of Communications 1985 #69).

With the advent of amateur radiotelephone operation, an endorsement was offered to amateurs who could copy Morse code at fifteen words per minute that would permit voice communications on some amateur bands. From 1955, this endorsement was formalized as an "advanced amateur" operator's certificate (Department of Communications 1985 #69).

The Department of Communications introduced a multiple-choice written examination to the Canadian amateur service in January 1975 (QST Editors 1975 #201). Canada led the world in the recognition of the

importance of digital communications with the introduction of the Amateur Digital Radio Operator's Certificate on September 15, 1978 (Hesler 1978 #107; Department of Communications 1985 #69). Digital transmission had been pioneered by three amateur groups in Canada (Borden and Rinaldo 1981 #43; Ball 1989 #31; Lockhart 2000 #147), and was to develop into a global packet radio network over the next decade (Lockhart 2000 #147). Further changes to the regulations in Canada in 1990 (Hennessee 1990 #104), and again in 1999 and 2000 modified amateur licensing to reflect newer technologies, some changes in amateur spectrum allocation, and operating requirements. In May, 2001, the Morse code requirement for full amateur operation on the short wave amateur bands was reduced from twelve to five words per minute (Charron 2001 #55; Industry Canada 2001 #123).

Organized Canadian Amateur Radio history also includes a look at the American Radio Relay League.

History of ARRL^[3]

Almost since the birth of Amateur Radio, the American Radio Relay League (ARRL) has been virtually synonymous with Radio Amateurs and short wave development. The late Hiram Percy Maxim founded the American Radio Relay League in 1914, and today is one of the largest Amateur organizations in the world. It has become the spokesperson for Amateur Radio in the United States, and for the most part in Canada until January 1, 1988. At this time the Canadian Radio Relay League (CRRL) became completely independent from the ARRL. The ARRL is an organization BY and FOR AMATEURS. Its Members elect a Board of Directors that manages the affairs of the League, which publishes the magazine QST on a monthly basis. The ARRL own and operate Amateur Radio Station W1AW, which carries bulletins on many frequencies and different modes. The ARRL also publish annually the Radio Amateurs Handbook along with many other publications.

The ARRL have a large Field Organization that covers the United States with elected Section Managers who appoint Section Emergency Coordinators, Section Traffic Managers, Emergency Coordinators, Official Observers,

Official Bulletin Stations and many other appointments in each ARRL Section. The ARRL sponsor many sought after operating awards and certificates such as the DXCC Award, WAS, VUCC, VHF/UHF Award and many others too numerous to mention here. Further information on these and others are available from ARRL Headquarters, 225 Main Street, Newington, CT. 06111-1494 USA and the ARRL website.

History of CRRL

The Canadian Radio Relay League (CRRL) was founded in 1920 to serve Canadian Amateurs. The CRRL was a Division of the ARRL with one Director who sat on the ARRL Board of Directors. The CRRL incorporated in 1979 as a self-governing and self-administering division of the ARRL. At this time CRRL managed the Canadian sections. On January 1, 1988 the Canadian Radio Relay League became autonomous and had their own Officers and a seven (7) member Board of Directors elected by CRRL Members. CRRL maintained the Canadian Field Organization with the same structure as ARRL. The Members of the League elected a Board of Directors that manages the affairs of the CRRL, which published the magazine QST Canada on a monthly basis. They published a Study Guide for Radio Amateur courses, a Canadian Amateur Call Book Directory and other operating aids for Amateur Radio operators. They sponsored the CRRL Central Incoming and Outgoing QSL Bureaus. They were also the Canadian representative and voting member of the International Amateur Radio Union (IARU), and paid annual membership dues for all licensed Canadian Amateurs, whether CRRL members or not.

History of CARF

The Canadian Amateur Radio Federation (CARF) was founded in 1967. Basically, the formation of CARF was a Federation of provincial organizations until the early 1970s. At this time reorganization took place that allowed individual members to join the National Organization. CARF published a magazine called The Canadian Amateur. They also published many operating aids, a Canadian Amateur Call Book and Study Guides for Radio Amateur courses across the country. CARF sponsored a number of Department of Communications (DOC), now Innovation, Science and Economic Development Canada (ISED),

symposiums across Canada, which brought together Amateur Radio operators and department officials for communications in Canada. This liaison created a mutual understanding for Amateur Radio operators' concerns.

Radio Amateurs of Canada

Radio Amateurs of Canada (RAC) was formed on May 3, 1993 when the CRRL and CARF merged after several years of discussion between the two National Organizations. RAC is a Not-For-Profit Organization incorporated within Canada. When CRRL became completely autonomous in 1988, this caused more confusion for Canadian Radio Amateurs when deciding which organization to support. Both the CRRL and CARF were duplicating many of the same services, which was a waste with a country having so few Amateur Radio operators. After much deliberation on the parts of both former organizations, a new National Organization for all Canadian Amateurs now represents all of the things that CARF and CRRL had done in the past. The best from both Organizations were implemented on May 3, 1993 and continue to grow with membership support.

The main services of RAC consist of a National magazine called The Canadian Amateur, published bi-monthly, the Field Organization that maintain supplies, certificates, and management of the Amateur Radio Emergency Service and the National Traffic System in each Section managed by Section Managers elected by RAC members. Study Guides for Amateur Radio courses are continually being improved for today's needs. RAC is also the voting member of the IARU.

RAC Members can voice their concerns through a Board of seven (7) elected Directors across Canada. The Board of Directors elects a slate of Executive Officers for day-to-day management of the Organization, which includes an Office Manager. The RAC administration office is in Ottawa, ON. This location provides close liaison with Innovation, Science and Economic Development Canada (ISED) officials in Ottawa. Please consider joining RAC, the single National Amateur Radio Organization in Canada. Membership support is needed more than ever

with the many issues that face Amateur Radio today. For further information contact the RAC Administration office at 720 Belfast Road, Suite 217, Ottawa, ON K1G 0Z5, the [RAC website](#), or your [Regional Director or Deputy/Assistant Directors](#) in your area.

References

- [1] Kevin McQuiggin VE7ZD / KN7Q's thesis: "Amateur Radio and Innovation in Telecommunications Technology" Simon Fraser University, 2001 <https://central.bac-lac.gc.ca/.item?id=MQ81893&op=pdf&app=Library>
See also page 20 for Kevin's Radio Ramblings this issue.
- [2] An alternate reference, (Department of Communications 1985 #69) states that amateur radio was first regulated in Canada in 1914.
- [3] Ken Oelke VE6AFO "History of Amateur Radio in Canada" reprinted with permission.
- [4] Wikipedia



Our cover story...

The Changing Face of Ham Radio



I asked some of our senior SARC members, some of whom were my Elmers, what they see as the most significant changes in the hobby over their timespan. Here are their responses... -Ed

John Brodie VA7XB, first certified in 1960

A few of the senior members of SARC were licensed in the 1960's or even earlier. To say that ham radio has changed since that time would be an understatement, as the changes have been truly profound.

During the last 5 or 6 decades we have seen the transition from vacuum tubes to semiconductors, AM to SSB, analog to digital, HF and line-of-sight to satellites and moonbounce, introduction of weak signal modes, printed circuits, integrated circuits, surface mount components, software defined radios (SDR) and others too numerous to mention.

But the most significant change, in my opinion, has been the integration of computers with radio and the Internet to the point that it is a rare amateur radio station that does not use a computer and web to augment the traditional radio. This combination controls the radio, turns the beam, predicts the propagation path, spots other station activity, logs the contacts, converts analog messages to digital (and vice-versa), maps transmitting locations, and with SDRs even performs many of the functions of conventional circuitry. The impact has also been felt in modern instrumentation which has mini computers built in to allow complex analysis undreamed of 20 years ago and for a fraction of the cost.

The integration of radio with the computer has been so complete that it is often said that when we have problems with our radios, it is usually interfacing with the computer or software that is the source of the problem. So in order to be proficient in the use of our equipment we in effect need to be proficient not only in operating radios, but also in IT. This has been a steep learning curve for some of the older hams who have difficulty in keeping up with the rapidly changing technology.

~ John VA7XB

On page 20 Kevin McQuiggin VE7ZD / KN7Q provides his 'Radio Ramblings' on the changes to the hobby since he was first licensed in 1977 as VE7CPT, and on page 105 in a Point—Counter Point article 'Is it really Basic'.



Radio Ramblings

Kevin McQuiggin VE7ZD/KN7Q

Technology and Toothbrushes



Since the last issue, I have been very busy teaching courses at the Justice Institute of British Columbia. With the pandemic, all instruction for the fall semester has gone virtual, and there has been as much effort on the part of instructors to “virtualize” their courses as there has been for students in their adoption of online learning. All in all, though, adaptation by all to the virtual environment has gone pretty well. We are mid-semester as I type this, and end of term is about seven weeks away.

Teaching left little time (or at least much less time than usual) for amateur radio, so I haven’t been on the air that much. Instead, I have been spending time focusing on the many little station modifications and repair jobs that had been neglected for a long time.

I will describe one of my repairs in a bit of detail, as it involved a tool new to the shack, but the bigger aspect of this repair work was that it caused me to think about the relationship between technologies which enable radio and other communications, and the use of the technologies themselves.

There are parallels between the division of interest in technology within amateur radio and the use of communication

technology by the general (non-ham) public, so I thought it a worthy topic for this month’s column.

The Tinkerer

Amateur radio began over 120 years ago with the popularization of scientific discoveries concerning “wireless waves” and the “aether”. No one knew exactly how radio signals propagated, but this did not prevent interested members of the public who had the time, financial resources and a “tinkerer” mindset from trying to duplicate these scientific experiments themselves.

Many people did, and most were successful in replicating early radio experiments and in building their own transmitters and receivers. Some, like Guglielmo Marconi, had high-end backing and financial resources, and leveraged these to create a whole new industry.

By 1910, hundreds of “radio amateurs” had their own stations and were communicating with one another. The amateur community in eastern North America was particularly active. As no commercial gear was available at affordable prices (radio equipment was sold by the Marconi Company largely in a monopoly), all amateur equipment was

home built, and tinkerers of all ages established their own stations and communicated with one another in order to test their equipment and experiment with new circuits and techniques.

In this era, radio was magic. It collapsed both space and time and allowed far-off events to be heard or described in real time, without dependency on the infrastructure required by telegraph or telephone circuits. While telegraphy and telephone service had been around for over 50 years, both required physical wires between the sender and receiver. Radio's "wireless" nature grabbed the public's imagination.

Amateurs' focus at this time was on the technology: how to build the most efficient transmitter and receiver; what new type of antenna would work better; how to incorporate new devices such as vacuum tubes into a radio station; what frequency to operate on, and at what time of day?

Less thought was given to what messages should be sent once communication was established, or the best way that radio technology could be used. For the tinkerers, the technology itself was their focus, not the content. To reinterpret Canadian sociologist Marshall McLuhan's famous assertion "*the medium is the message*" [1], hams in this era focused on the *medium*, not on the *message*.

The Technological Foundation of Amateur Radio

When amateur radio was first regulated by governments in the 1910s, the focus of certification was on the technical aspects of the hobby. Amateurs were required by law to possess a very high level of technical understanding of radio, electronics, and also of radio equipment design and maintenance skills.

This emphasis on technicality was to ensure that hobbyist radio equipment did not interfere with commercial radio systems. The presumption, of course, was that amateurs would be building their own gear - a logical perspective given the rarity of radio equipment at the time. Government wanted to ensure that amateur gear would meet basic technical standards and not interfere with commercial, military, and other radio systems.

This is one reason why, to this day, amateur radio certification maintains a fairly high technical standard, and why our modern amateur radio examinations focus largely on the technological aspects of radio.

Radio Has Evolved

In the ten decades since 1910, humanity's understanding of radio, modulation schemes, antennas and propagation theory has expanded greatly. Advanced antennas, improved electronics, and more recently the development of digital radio have generated incredible improvements in the sensitivity, selectivity and stability of radio systems.

Regulations have evolved as well, including those governing amateur radio. The technical requirements for certification have been greatly reduced, but the technical component of amateur examinations still represents a significant hurdle for new would-be amateurs. Why is this?

Non-interference by the amateur service with commercial, military other radio services is still a major concern to regulators. This is one of the reasons why the technical components of certification persist in amateur certification standards [2].

What has also evolved during this time is amateurs' opportunity to focus on other non-technical aspects of radio technology. As their equipment became easier to use and many of the technical problems with selectivity and sensitivity were solved, hams could begin to focus on the *application* of radio technology to further community service, emergency response, and other events.

Amateurs have always had strong interest in emergency and public safety communications, but it was not until the 1930s after radio technology had stabilized and the basic functionality of most transmitters and receivers could be assured, that hams were able to concentrate on, and specialize in, this important area.

In the subsequent decades, the bifurcation separating those hams with *foundational and technical focus* from those more interested in the *application of amateur radio* has continued and grown more distinct.

One Hobby, Two Cohorts

In the past couple of decades, the division between the technically oriented “builder and experimenter” hams and the “emergency preparedness/community service” hams has become more distinct.

The *technical cohort* innovates and develops new radio techniques and technologies, but often, beyond the challenges of getting the new equipment designed, tested and working, they have little interest in actually using it. I can think of several “techie” hams that I know who fit into this category.

Meanwhile, the *communicator cohort* focuses on emergency preparedness, public service, exercises, and liaison with the formal emergency service community. This group uses technology, (even new technology which may have emerged from the technical group), but has less interest in designing and building equipment. I know several amateurs in this group as well.

I do not make this distinction with the intention of dividing our hobby or pitting one group against the other: quite the contrary! Despite the different very different interests of these two groups of hams, I have observed over several decades of experience that they usually get along quite well. This is one of the best aspects of amateur radio. *Robust amateur radio clubs or societies usually have members in both camps*, and it is interesting to experience the synergy of the groups working together to solve technical problems and use newer technologies to better serve the community.

Why Does This Matter?

So why does this matter, and why I am writing about it? The reason has to do with the future of amateur radio.

The first reason that this matters is that amateurs who are aware of the two cohorts, each with different foci, will be better prepared to work together.

Close collaboration between the technical and user groups will develop more innovative, functional new technologies which will serve users and the broader community more effectively.

It will also help to better incorporate new technologies, modes and frequencies into emergency preparedness and public service activities. Amateur radio and the community will be better served through this collaboration.

Secondly, technology is advancing rapidly, and for the amateur service to remain relevant (and importantly, to retain the support of national governments) it must ensure that it stays abreast of these new technologies, and even leads in the development of new ones. In its rich history amateur radio has been the source of many innovative new technologies, and there is no reason why the avocation cannot continue in this leadership role. However, to do so those amateurs with technical interests and skills (the technical cohort) need to have the full support of the communicators. Communicators need to work with the technical group to describe their needs and visions of the future.

Thirdly, members of the technical cohort sometimes do not appreciate the public service focus of the communicators. Sometimes the “techies” interpret the communicators’ lack of technical skills as a liability for the hobby. While government does indeed see amateur radio as a primarily technical service, most governments also understand the strong history of amateur radio in emergency and disaster response and support the avocation for this reason. Lack of technicality, in and of itself, does not seriously undermine government’s view of the amateur radio service.

What does matter to everyone is the future of amateur radio. The best way to ensure continuing regulatory support for the amateur radio service is for the technical and communicator cohorts to work together, both in the area of innovation and technical development and in the operational role of amateur radio in supporting the community.

How This Relates to the Internet Generation

Now I’d like to pivot back towards innovation and the idea of the “magic” of radio. This issue of the Communicator focuses on youth and the future of amateur radio, so this is an relevant subject.

As the famous Italian philosopher George Santayana said in his 1905 book, “The Life of Reason”:

“Those who cannot remember the past are condemned to repeat it.” [3].

Interestingly, what we are seeing with the current generation’s use of the “latest and greatest” global communications technology (i.e. the Internet) is a division of interests into the same cohorts that arose in early amateur radio.

The Internet certainly provides its fortunate users with global communications and the ability to transmit their thoughts around the world in an instant, but it differs from radio in two fundamental ways:

- The Internet is a network of networks [4] with global reach, but it is a physical network based on wired connectivity between end users. Wireless may be used for “the last mile”, i.e. WiFi or some incidental use of wireless point-to-point links, but the entire Internet is based on physical infrastructure comprised of routers and other equipment valued at billions of dollars; and
- The Internet is primarily a commercial network and operates as a commercial service. Users pay for connection to the service, and service providers agree to provide connectivity at a contracted bandwidth for a fee. It is far too common for some portions of the network to be “down”. Outages prevent customers from being able to communicate.

Despite its reliance on physical networking and its commercial nature, users of the Internet have still divided themselves into cohorts. The *communicator cohort* (to continue our terminology from above) is by far the largest contingent: those who use the network and focus on the act of communicating and the content which they can access or upload.

There is a *technical cohort* using the Internet as well: it is comprised of those users who develop new applications or technologies which utilize Internet connectivity in order to innovate and develop new capabilities or services “on top of” the network’s physical infrastructure.

This should sound familiar: two groups interested in the resource - one interested in the technology itself and the other interested in using it for global communications. History is repeating itself in a slightly altered form.

As in the amateur radio community, the balance and level of collaboration between the two Internet cohorts is not optimal. Users on the Internet far outnumber those with technical interests, and most members of the Internet’s communicator cohort have a near nil understanding of the underlying technology. The technological gap between the two cohorts on the Internet is much, much wider than in the amateur radio community, where under international legislation all participants must possess a base level of understanding of radio technology.

Imagine needing a license to use the Internet: to have to write a test and be able to explain IP addresses, subnets, routing, DNS and the like before being approved as a user by the government [5]. The certification requirement in amateur radio limits the number of people involved in the hobby as a whole.

The commercial environment of the Internet also drives the mindset of the technically-capable software and hardware developers. Most in the Internet’s technical cohort dream of developing the next “killer app” and buying their own island with the proceeds. They are financially focused.

It is difficult to appeal to this subset of software and hardware developers with an altruistic idea focused on public service. It’s only a small percentage of this cohort who develop new technologies and perform experiments out of curiosity alone. Yet this group, like those people in amateur radio who developed new modes such as SSB and packet radio, have been responsible for some of the most innovative new protocols and services on the Internet. We have a name for these folks: “the open source community”.

Open source software and hardware form the basis of many of the most popular Internet services and devices. The worldwide web; several programming languages; the Linux operating system; the MySQL database; the “Apache” web server; many open source

hardware and networking devices: these all arose because of altruistic dreamers who saw potential in the Internet and wanted to make it better for everyone without regard to personal fortune. Very much like the way that new technologies and operating techniques were developed within amateur radio.

How can we draw more young people, particularly those involved in the open source hardware and software communities into amateur radio? What does amateur radio provide that a billion-dollar wired infrastructure cannot? We can answer these questions, but these young people cannot, because they do not know what amateur radio has to offer.

Amateur radio should work with the open source community (those working on new techniques and technologies *out of curiosity and to make things better*, rather than specifically for profit) and progressive Internet users interested more in building robust community services than in simply consuming content to point out the dependency of global Internet service upon wired infrastructure, and the fact that ham radio provides similar global communications capabilities but without any of the physical dependencies of the Internet.

This idea could find real appeal among Internet users, especially those involved in open source development, and generate an interest in learning more about amateur radio. Communication without dependency on physical infrastructure can have the same appeal that it did to young people (and interested adults) as it did in the early 20th century.

A Toothy Problem

Finally, I will turn to a technical issue that I had with a piece of old equipment this month and how I found an unusual solution to it. I collect old minicomputers and associated peripheral equipment from the 1970s and 1980s.

A recent acquisition was a classic Texas Instruments “Silent 700” terminal from the early 1980s. The terminal operates at 300 bits per second (bps), has an internal modem and includes an acoustic coupler that is used to connect the terminal to a regular telephone handset. See Figure 1.



Figure 1 - Silent 700 Terminal

I bought the terminal on eBay after considerable review and research of the seller. It arrived quickly, was well-packed, and to my delight operated well both when connected directly to another terminal in my shack, and via the acoustic coupler to some of the few remaining dialup BBS (bulletin board services) still running in North America. A successful eBay transaction!

After using the terminal for a couple of weeks, however, I noted that the connection to an external terminal or BBS service could be flaky. The connection would work, but then drop out, or a successful session would then be followed by the terminal’s inability to detect a carrier signal, sometimes just minutes later. It was an intermittent failure - one of those things that can be very difficult to troubleshoot.

Over the course of several connection tests I noticed that every time the terminal switched to “online” mode there was a little “click” of an internal relay. Sometimes the “click” would sound duller than other times. The duller “click” usually indicated a problem. The terminal had been sitting unused for a couple of decades at least: maybe the little lever inside the relay was stuck or flaky.

I was determined to fix the terminal, but where should I start? These terminals have been out of production for decades.

To the rescue: the “Bitsavers” web site. See <https://bitsavers.org>. Founder Eric Smith maintains a web site dedicated to early computing hardware and software, and over the past twenty years has collected many thousands of manuals,

applications, schematics, operating systems and other material saved from the dumpster. I have known Eric since the 1990s and in fact have contributed a few manuals (on the obsolete series of “Varian” minicomputers which I used at SFU) to him over the years.

I looked in the hardware section of Bitsavers and found a folder dedicated to Texas Instruments equipment. Subfolder “terminals” had both the user and service manuals for the Silent 700. The service manual (dated 1982) contained the full schematic diagram of the terminal for both the “703” and “707” models. My model was the “707”. I was in luck!

I perused the schematic for a few days, trying to figure out why the relay would be clicking irregularly. This was not a documented issue. The relay was key in establishment of a connection, so I knew that the irregularity might have something to do with the problem. With the help of the maintenance manual, I decided to take the terminal apart and investigate.

The terminal came apart pretty easily, as shown in Figure 2.



Figure 2 - Partially Disassembled Terminal

I found the relay in question - it was located in the top left-hand corner of the main circuit board. See Figure 3 for a closeup. Unfortunately, the relay was encapsulated and there was no way to

see what was wrong with it - truly “no user serviceable parts inside”.

I doubted that I would be able to find an exact replacement part 40 years on from the terminal’s manufacture date. I tried tapping the relay with the handle of my large screwdriver. The relay would then switch normally, but was still intermittent. After a few connection sessions it would fail again.

I needed a way to dislodge whatever might be wrong with the innards of the relay. Inspiration struck: why not use an electric toothbrush? The high-speed vibration of the brush head would be the perfect tool for producing localized vibration that would hopefully undo whatever was wrong with the relay.

I still use an old manual toothbrush, but my wife Laura (VE7LPM) switched to an electric brush many years ago. I decided to “borrow” her toothbrush for a little experiment.

I crept to the bathroom while Laura was on the ‘net in our TV room and quietly made off with her device. It’s a fancy, multispeed Philips “Sonicare” contraption so I figured that it would do the trick. See Figure 4. So many questions: which setting I should use? I fired up the little machine. After some deliberation I decided to go with the “PEARLY WHITE” rather than the “SUPER CLEAN” setting so as not to vibrate the relay off of its solder pads. I didn’t want to overdo it. How long to leave the brush applied? This was a tough question. There being no points of reference for “toothbrush interfacing” in the engineering literature, I fell back onto ham radio tradition and simply pulled a figure out the air: about 20-30 seconds should do it.

The electric toothbrush was firmly applied to the problematic relay for about 30 seconds, as shown in Figure 5. At the time, it was hard to tell if it helped, but I noticed that as a byproduct



Figure 3 - The Flaky Relay

Figure 4 - The Tool



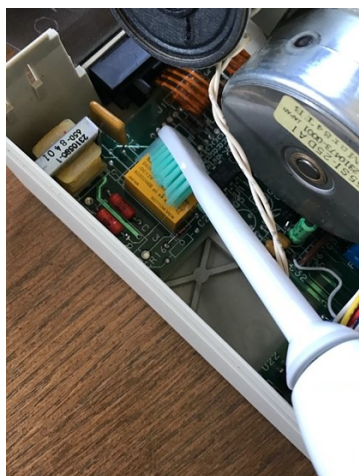


Figure 5 - Relay Treatment in Progress

the vigorous brushing cleaned up the relay and surrounding circuit board quite nicely. The PCB and surrounding components were incredibly shiny and bright - just like new! Maybe I should have used toothpaste as well...

My mind drifted to the next time Laura would be brushing her teeth. Hmmm, I had better clean up the brush head to remove the dirt and grit. I scrubbed the head thoroughly before slipping the device back into its holder in the bathroom.

Treatment completed, I closed up the Silent 700 and gave it a try. To my delight, I made a successful 300 bps connection to the "Reign of Fire" BBS in

Wisconsin and was able to browse the system. The site is an authentic resurrection of a popular BBS from the 1980s.

The toothy treatment seems to have worked. I have used the terminal for many hours after the repair, and the relay seems to be switching reliably now. Better than that, there was no fallout from the surreptitious use of Laura's device.

Next time you face a toothy problem in equipment repair, don't brush off oddball solutions using tools that are not traditionally meant for the shack!

Summary

That's it for this month! Feedback on this article can be directed to the Editor, or directly to me at mcquiggi@sfu.ca.

73,

~ Kevin VE7ZD / KN7Q

References

- [1] https://en.wikipedia.org/wiki/Marshall_McLuhan
- [2] The other reason for these technical standards is that beginning in the 1930s, governments began to appreciate the value of the amateur radio service as a "national reserve" of technically skilled electronics technicians and radio operators. Their reasoning (then and now) is that in time of national emergency or war, that the amateur service will be a source of "almost ready" radio operators and electronics technicians for government and the armed forces.

This idea proved valuable to Canada, the United States, and other nations in World War II and subsequent conflicts, where the amateur radio service provides thousands of radio operators and technicians to the armed forces.
- [3] https://en.wikiquote.org/wiki/George_Santayana
- [4] Its original definition. See <https://www.britannica.com/technology/Internet>
- [5] Certification is required for the amateur radio service primarily due to the government wanting to reduce the potential of interference between amateur radio and other radio services.





SUPERBOY





HEY, FELLERS AND GIRLS! HERE IS SOMETHING YOU CAN MAKE!

SUPERBOY'S

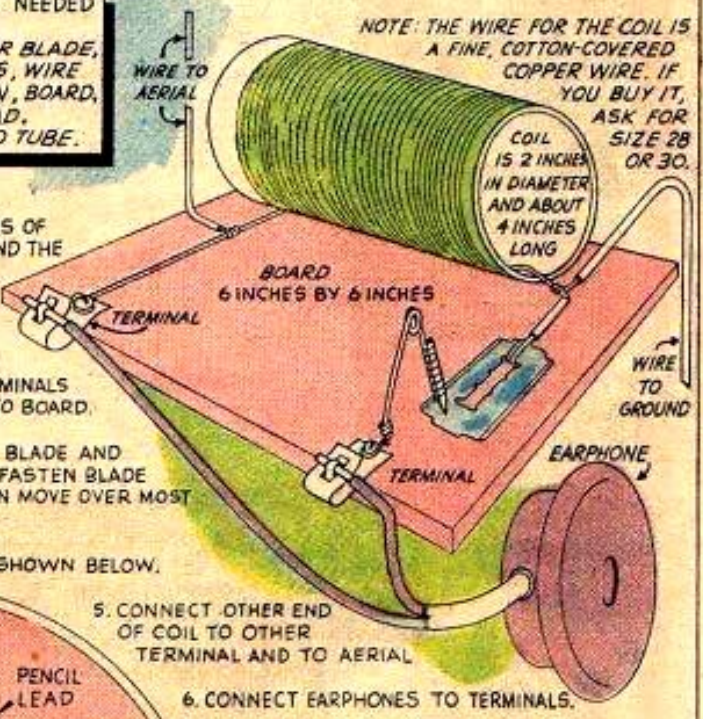
WORKSHOP

RAZOR BLADE RADIO

THIS AMAZINGLY SIMPLE RADIO WILL RECEIVE LOCAL BROADCASTS, COSTS ALMOST NOTHING AND IS VERY SIMPLE TO MAKE.



MATERIALS NEEDED
 'BLUE' RAZOR BLADE,
 EARPHONES, WIRE
 SAFETY PIN, BOARD,
 PENCIL LEAD,
 CARDBOARD TUBE.



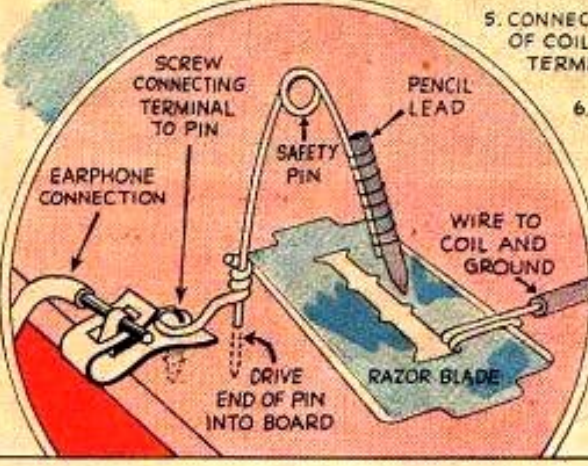
NOTE: THE WIRE FOR THE COIL IS A FINE, COTTON-COVERED COPPER WIRE. IF YOU BUY IT, ASK FOR SIZE 28 OR 30.

COIL IS 2 INCHES IN DIAMETER AND ABOUT 4 INCHES LONG

BOARD 6 INCHES BY 6 INCHES

HOW TO BUILD THE SET

1. MAKE THE COIL BY WINDING 120 TURNS OF FINE, COTTON-COVERED WIRE AROUND THE TUBE. FASTEN TO BOARD AS SHOWN.
2. SNIP OFF THE HEAD OF THE SAFETY PIN. ATTACH PENCIL LEAD TO THE SHORT SIDE OF PIN. PUSH POINTED SIDE INTO BOARD. FASTEN TWO TERMINALS (TAKEN FROM DISCARDED BATTERY) TO BOARD.
3. CONNECT ONE END OF COIL TO RAZOR BLADE AND TO A GROUND, SUCH AS A RADIATOR. FASTEN BLADE TO BOARD SO THAT PENCIL LEAD CAN MOVE OVER MOST OF BLADE'S SURFACE.
4. CONNECT PIN TO ONE TERMINAL AS SHOWN BELOW.
5. CONNECT OTHER END OF COIL TO OTHER TERMINAL AND TO AERIAL.
6. CONNECT EARPHONES TO TERMINALS.



SCREW CONNECTING TERMINAL TO PIN

PENCIL LEAD

SAFETY PIN

WIRE TO COIL AND GROUND

RAZOR BLADE

DRIVE END OF PIN INTO BOARD

EARPHONE CONNECTION

TUNING IN

MOVE THE PENCIL LEAD OVER THE BLADE UNTIL YOU FIND THE SPOTS WHICH GIVE YOU THE BEST VOLUME AND CLARITY. BETTER RESULTS MAY BE OBTAINED BY SCRATCHING THE SURFACE OF THE BLADE WITH A NAIL FILE AND PLACING THE LEAD ON THE SCRATCHES.

IT WILL TAKE PATIENCE TO FIND THE BEST SPOTS. YOU WILL GET BEST RECEPTION AT NIGHT. WITH A GOOD AERIAL YOU WILL GET AMAZING RESULTS.

"Yes, a receiver such as this would still work nowadays on AM broadcast stations but not with modern headphones which are invariably low impedance. You would need to find surplus pair of high impedance headphones from a swap meet or old-timer's junk box" equipment. Either that, or use a high to low impedance transformer.

Our cover story...

Where has the mystique gone?

Geoff Emery VK4ZPP



In the world today, we have many young people using technology which we of the older generations probably never thought of as other than a fantasy. For these people, the aura of the warm glowing radio valves is unknown, unless they are lucky enough to be introduced to them. But for these young people, is there the mystique, the magic and allure that once entice their grandparents?

If we remember, as adults, what the younger, growing years are like, they are the time of boundless curiosity and trying to find our personal place, our niche in the world and acceptance of our peers. Fortunately, the processes of growing up do not radically change but the atmosphere, the surroundings in which this happens does meld and morph as technology produces more instruments of entertainment in ever smaller packages. It is a fact that when we enjoy a pursuit, we like to encourage others to join us in it. Sometimes the years that have passed do not seem to allow young and parental type adults to pick up and entice each other into what they feel are important and esoteric activities. The language of the peer groups can be a protection for the youth seeking privacy from parental intrusion and the seeming formality of the older people can seem a deterrent to the younger. Should these be irreconcilable?

We need to understand more of what is enthralling to the generation of the internet and the mobile devices. For the technologically savvy young person, there should be a welcome entry into a technological pursuit such as amateur radio. The different developments which span such a universe of knowledge in science and technology can engross the mind that is exploring and learning, assimilating what the world has to offer.

From satellites and the associated astrophysics and astronomy to the subterranean pursuits of long wave ground propagation with the earth sciences and electronic technology the engagement of amateur radio goes and spreads. We can take our devices and engage them with other articles and develop skills in coding and searching out minute pieces of information. We can talk around the globe with and without using the internet and we can bounce signals back to earth from the Moon.

There is so much more that goes with amateur radio such as friendships that last and last and we may never get to meet in person. And if we do travel, there are friendly faces who will welcome us along the way because of this hobby. We can be makers and developers or just the relaxed hobbyist; we can be students and use the knowledge from our hobby to become a professional. We can take part in safety networks and we can exercise in radio sport, hone our operating skills in contesting or challenge ourselves to gain certificates and awards.



...is there the mystique, the magic and allure that once entice their grandparents?

With all this at our finger tips, how do we get that person with the sparkle in the eye to become a participant? How do we reach out the hand of friendship and tell someone how great we find this pursuit? How do you who is interested in science and technology get to meet with us, find a mentor and get to enjoy the same glow of satisfaction of the hundreds and thousands of radio amateurs around the world.

Today the world may seem more closed down than it should be because of the epidemic restrictions. Today radio amateurs are communicating in so many ways free of those

restrictions because we use the same radio waves that bring the internet and our family and friends voices to our mobile phones. Today radio amateurs are relaxing and chatting, challenging themselves with new skills and today you can join with us too.

We just need to find the words to ask the questions.

*~ I'm Geoff Emery VK4ZPP
and that's what I think... how about you?*



Cover Topic:

The Changing Face of Ham Radio: The Rise of Digital Modes

Anthony Luscre, K8ZT



Change in Amateur Radio operation modes often comes slowly due to the need to change equipment. Two major changes in the history of Amateur Radio that vividly illustrate this include the transition from spark to CW and the move from AM to SSB (single sideband). Both required a fundamental change in the radio equipment that Hams used.

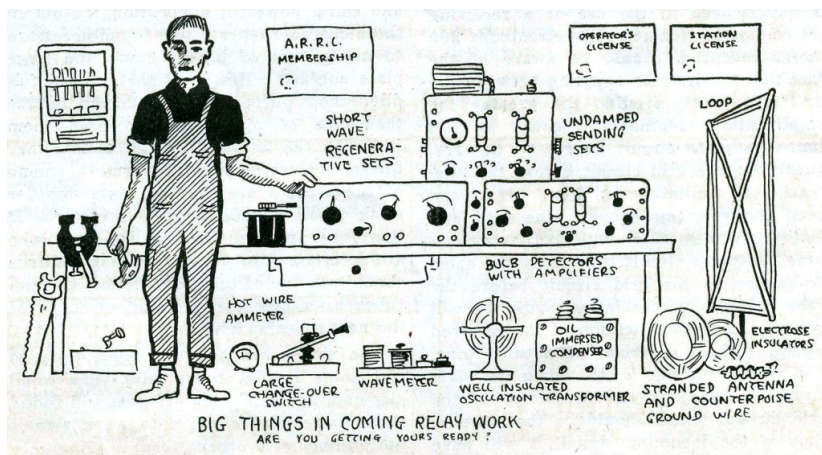
These types of hardware changes usually happen more gradually due to the costs of acquiring new equipment or modifying existing equipment through the use of add-on devices. If we take a look at changes/trends that have occurred rather quickly, we see many of these required the addition of simple accessories rather than major equipment. A good example is the rapid explosion of Packet Radio in the early 1980s. Most Hams already had 2-meter FM transceivers; the addition of the TNC (Terminal

Node Controller) and a personal computer allowed for quick adoption. From a few experimenters in 1978 to “almost everyone,” Packet Radio adoption was almost an overnight phenomenon.

Although the use of Packet Radio dropped off dramatically, the personal computer that snuck into the radio shack as part of the process stayed around and got much more sophisticated and powerful. The shack computer was soon integrated into rig control as well as logging and contesting software. We take these things for granted in today’s shack, and even though they have changed how we do many things, they have also fundamentally changed many of the modes we use to make Amateur Radio contacts. No longer did big changes in modes require hardware retrofits as new mode after new mode has been developed utilizing the PC and so-called “Digital Sound Card Modes” (DSM). Some DSMs are very different, but some are simply software replacements for historical hardware modes. RTTY is a great example. During the pre-computer years, RTTY was accomplished through the use of big, heavy and loud electromechanical teleprinters. This made RTTY a rather esoteric mode practiced by a minority of Hams willing to make the investment in these machines. Today, RTTY is available via simple software programs or even built directly into modern radios like the [ICOM IC-7300](#), [Yaesu FTDX-3000](#), or Elecraft K3S.

Weak Signal Modes Come on Strong

The “Digital Sound Card Modes Revolution” is seen in the proliferation of new modes over the last few decades, including PSK, Olivia, Throb, Hellschreiber, and many others. Currently, the

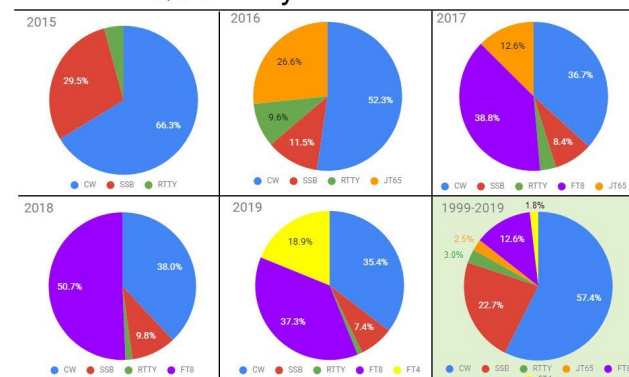


combined activity on all these modes is dwarfed by a group of three modes (JT65, FT8 and FT4) that make up the WSJT weak signal modes software package by Joe Taylor, K1JT*.

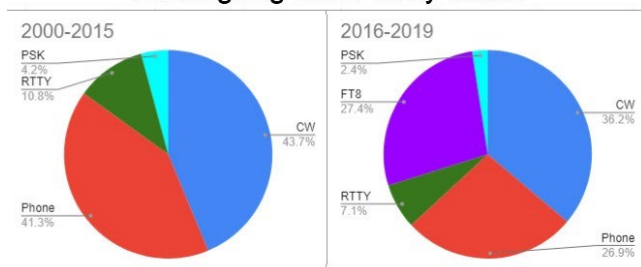
Many people have debated the positive and negative effects of WSJT (Weak Signal/Joe Taylor) modes, but few would disagree that the effect has been a seismic and almost an overnight phenomenon. The switch from majority AM to majority SSB took over a decade, but the wide use of FT8 took less than a year! Looking at my own log, I can draw a few conclusions on changes in my HF operation modes that I think also apply to many other Hams.

The two charts below show the results from Clublog.org where the sample size is a little larger (over 500,000 QSOs)! If you are interested in taking a deeper look at Clublog mode data, G7VJR and LA8AJA have very informative websites.

QSO % by Mode at K8ZT

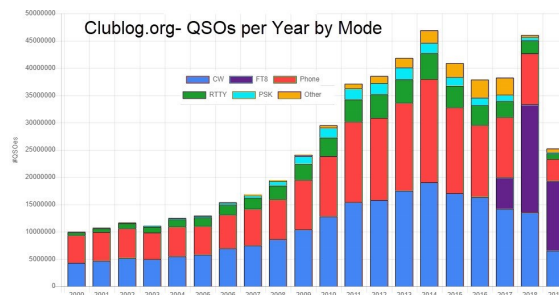


Clublog.org QSO % by Mode



I first started using JT65 in March of 2016. By the end of the year, it accounted for 26% (1,109 of 4,168) of my QSOs. I started using FT8 the week K1JT released it to the public in July 2017. With only six months of FT8 operation, it still made up

almost 39% of my year's total QSOs (2,085 of 5,376). In 2018, FT8 accounted for over half of my QSOs (4,417 of 8,722). FT4 was released in April 2019 and has accounted for almost 19% of this year's QSOs as of September 2019 (1,362 of 7,189).



When I started using JT65 in 2016, it had already been in use for a few years. Released in 2003, JT65 was intended for extremely weak but slowly varying signals, such as those found on troposcatter or Earth-Moon-Earth (EME, or moonbounce) paths. It can decode signals many decibels below the noise floor, often allowing amateurs to successfully exchange contact information without signals being audible to the human ear.

Like the other WSJT modes, multiple-frequency shift keying is employed; unlike most other Ham Radio modes, messages are transmitted as atomic units after being compressed and then encoded with a process known as forward error correction, or FEC. The FEC adds redundancy to the data, such that all of a message may be successfully recovered even if some bits are not received. Because of this FEC process, messages are either decoded correctly or not decoded at all, with very high probability. After messages are encoded, they are transmitted using MFSK with 65 tones (hence the name JT65).^[1] The big change came when more and more Hams began using JT65 on the HF bands.

The general Ham population soon learned that if they could be patient (patience was required as typical QSOs took four minutes to complete), they could make long-distance contacts even with moderate to poor conditions and low to modest power. QRP operators like myself found ourselves calling CQ and getting multiple replies from DX stations!

There were still three big problems. First, it took a long time to make contacts. Second, it required more than a little computer knowledge. Third, it took some tinkering to set up the software and

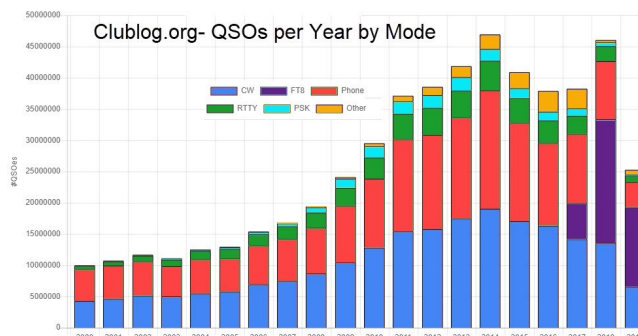
sound interface. The first issue (long QSO time requirement) was not a problem for me since I was doing a lot of writing, spreadsheets, and other computer work so I was able to run JT65 in the background while I multitasked on the computer. The second problem was mostly solved by many Hams being proficient with computers and software. Fortunately, their willingness to assist Hams who were not as computer proficient got others on the mode in the true Amateur Radio Elmer tradition. To solve the third issue, most Hams went one of two routes: adding a rig interface accessory or using radios with built-in sound card interfaces. The two major rig interfaces available are the [Tigertronics Signalink™](#) USB Digital Communications Interface and [MFJ 1204 Series USB Digital Mode Interfaces](#). They allow plug-and-play interfacing for most modern radios.

Although you can operate FT8 with older transceivers, the best experience will come by using a transceiver capable of both computer control and dedicated data mode. Fortunately, most modern radios have both of these. The extra feature that many of today's radios have is a built-in sound card which eliminates the need for the external sound card interface. Many reasonably priced popular radios have this feature, including the [ICOM IC-7300](#), Yaesu FT-991A, and [Kenwood TS-590SG](#). If you are looking for a mobile/base radio, the [ICOM IC-7100 HF/VHF/UHF](#) also has these features and at a bargain price.

The release of FT8 reduced the time of a typical QSO by half, opening the floodgates as more and more Hams tried out this mode. The results: More Hams on the mode mean the more chances for QSOs, and the increased chance of a QSO—especially with rare DX stations—means the greater the number of Hams who want to get on the mode. Consequently, there is more demand to include the mode in contests. FT4 has been developed to allow better integration with exchanges used in contesting. It is also faster, again cutting QSO time in half.

One interesting fact confirmed by my own experience is that FT8 and FT4 are not just becoming a bigger part of Hams' yearly QSOs—they are also increasing dramatically the activity on the post-WARC bands (60, 30, 17, and 12 meters). Activity is increasing in both sheer numbers as well

as interest in WAS (Work All States) and DXCC on these bands. The second interesting fact, especially during this low sunspot period, is that we are seeing that bands we assumed were dead are actually supporting almost daily QSOs (see "Want to Work 6, 10 or 12 Meters But No Sunspots? Use Summer E Skip and FT8!").



As for future trends, I think there will be more use of FT4 and a big increase in use of FT4 in contesting. One major move in this direction occurred during the last week of August with the first running of the [WW Digi](#) Contest. If this contest continues to grow, it may eventually rival the corresponding [WW RTTY](#), [WW Phone](#) and [WW CW](#) contests.

~ Anthony Luscre K8ZT

*Along with being an Amateur Radio pioneer, [astrophysicist and professor](#) Joe Taylor, K1JT, won the Nobel Prize in Physics in 1993—one of many honors he has received during his illustrious career. Read more about his groundbreaking Weak Signal Communications Software at his [official site](#).

[1] Joe Taylor, K1JT (September-October 2005). "The JT65 Communications Protocol" (PDF). QEX: A Forum for Communications Experimenters: 3-12.

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A trip down memory lane for many of us...



THE NEW HEATHKIT VACUUM TUBE VOLTMETER KIT

The most beautiful VTVM ever offered now available in kit form. Every part supplied: all punched, lettered and formed.

A balanced bridge circuit, 11 megohm input resistance, measures both AC and DC electronically. Ranges 3-30-100-300-1000 volts AC or DC. Ohmmeter .1 ohm to 1000 megohms. Includes DB scale. Complete with tubes, 500 microamp meter, cabinet, blueprints, and instructions. Shipping Wt. 8 lbs.

BUILD IT YOURSELF \$24.50

NEW Heathkit SIGNAL TRACER AND UNIVERSAL TEST SPEAKER KIT

\$19.50

Nothing ELSE TO BUY

The popular Heathkit signal tracer has now been combined with a universal test speaker at no increase in price. The same high quality tracer follows signal from antenna to speaker—locates intermittents—defective parts quicker—saves valuable service time—gives greater income per service hour. Works equally well on broadcast—FM or TV receivers. The test speaker has assortment of switching ranges to match push pull or single output impedance. Also test microphones, pickups—PA systems—comes complete—cabinet—110V. 60 cycle power transformer—tubes, test probe, all parts and detailed instructions for assembly and use. Shipping Wt., 8 lbs.

HEATHKIT RF SIGNAL GENERATOR KIT

Every shop needs a good signal generator. The Heathkit fulfills every servicing need, fundamentals from 150Kc. to 30 megacycles with strong harmonics over 100 megacycles covering the new television and FM bands. 110V 60 cycle transformer operated power supply.

400 cycle audio available for modulation or audio testing. Uses 6SN7 as RF oscillator and audio amplifier. Complete kit has every part necessary and detailed blueprints and instructions enable the builder to assemble it in a few hours. Large easy read calibration. Convenient size 9" x 6" x 4". Shipping weight 4½ lbs.

\$19.50 *Nothing ELSE TO BUY*

Heathkit RADIO KIT

An ideal way to learn radio. This kit is complete ready to assemble with tubes and all other parts. Operates from 110V AC. Simple, clear radio testing course. Includes this & good radio testing course. Includes regular broadcast and short wave bands. Plug-in coils. Regenerative circuit. Operates loud speaker. Model K-2.

Shipping Wt. 4 lbs.

EP50 Headphones, per set..... \$1.00
Shipping Wt. 1 lb.

No. 309 2½" Permanent Magnet Loudspeaker..... \$2.95
Shipping Wt. 2 lbs.

Mahogany Cabinet..... \$2.95
Shipping Wt. 8 lbs.

\$8.75

ONE WAY WALKIE TALKIE

Attention CB fans! Here is a tremendous value in a portable two-way radio transceiver!... Heathkit GW-52. Nowhere will you find a transceiver of such outstanding quality, with as many high performance features at so low a price! Designed for rugged duty and reliable two-way radio communications over extended ranges, the Heathkit GW-52 features a powerful 10-transistor, 2-diode circuit... long-range transmitter with one-watt input... sensitive superheterodyne receiver with ½ microvolt sensitivity for 10 db signal-to-noise ratio... crystal-controlled transmitter and receiver... built-in squelch & automatic noise limiter for crisp, clear communications... a heavy-duty, 10-cell rechargeable nickel-cadmium battery with 500 milliamper-hour rating that will outlast conventional batteries many times over... built-in battery condition meter... built-in battery charger and more! "Solid" communications may be established at ranges of 3 to 5 miles between units and even more when used with Class 2 CB stations or external antenna. Battery may be recharged in any standard 110V AC source.

Low Cost 5-Band SSB-CW Transceiver

\$240.00 no money dn., \$22 mo.

The Heathkit HW-100 Five-Band SSB-CW Transceiver... with all the features and performance of competitive brands... at a money-saving kit price

NEW HEATH RESEARCH

Top View of the HW-100... shows the neat layout provided by the five circuit boards which mount on the top of the chassis. Note the completely enclosed VFO and shielded Final Amplifier.

Bottom View of the HW-100... shows the four vertical circuit boards with mounted direct wafers and crystals. Amplifier bandswitch is located in its own shielded compartment.

Can We Signal MARS

The Possibility of Interplanetary

Including the Views of Dr. Lee de Forest and Nikola Tesla

● THE possibility that intelligent life exists somewhere else in the universe than on earth is an intriguing subject. The possibility that we might in some way or other achieve intelligible communication with some other planet is even more exciting. The astronomer, in replying to questions about life in the universe—and scarcely a week passes but that he meets the query in some form—is forced to rely on cold scientific facts. He does not believe in the validity of the argument so frequently advanced: that the earth, being so insignificant, could hardly have been selected as the only place in the universe for the development of life. This argument proves nothing. One might quite as logically reason in the reverse direction, and say that man is so much more insignificant that the presence of life is an improbable accident that could scarcely happen twice in an otherwise well-ordered universe.

When we approach the problem of possible planetary life and interplanetary communication scientifically, we are forced first to study (even if we cannot answer) the question "What is life?" On the earth, we find a multitude of living organism, ranging from minute single-cell organism bacteria to the highly complex *homo sapiens* (man). If we limit the consideration to intelligent life, then the problem becomes still more difficult. There is no simple way of finding an answer, especially for those people for whom "seeing is believing." No telescope yet built or under construction is sufficiently powerful to show the form of even the largest mammal, even if it were located on as near an object as the moon. Meteors and meteorites, our only direct messengers from space, have shown no evidence of the existence of living organism beyond. Our

approach obviously, must be indirect.

What Is Necessary to Support Life?

First of all, we may survey the known planets and regard the relative likelihood of their being inhabited. There is one prime test for the existence of life, as we know it, on the earth: the existence of liquid water. Water, apparently, is the one most important constituent of all cells. Oxygen is not necessary, since plants exist on carbon dioxide. Not even carbon is absolutely necessary, since certain bacteria have been found that are composed chiefly of sulphur. Presumably, however, carbon would be necessary for any higher form of life, owing to the peculiar chemical property of that element in being able to string itself together with atoms of oxygen and hydrogen into long and complex chains to form protoplasm cell-base. But water, in the liquid state, is absolutely necessary. Water, because of its peculiar physical and chemical properties, could not be replaced by any other solvent.

Consequently, when we wish to examine the possibility of the planets' being inhabited, we must first investigate whether liquid water could exist on their surfaces. For that reason, both the moon and Mercury can be dismissed. Both of these bodies are too hot on their sunward side and too cold on the night side. We may also dismiss the smaller planets, the asteroids, which are so small that water would have completely disappeared from their surfaces. Jupiter, Saturn,

liquid air. We could have dismissed these major planets on other grounds, mainly the presence of such gases as ammonia and methane in their atmosphere, which would not be very conducive to the existence of life.

Mars and Venus

In the solar system there remain, aside from the earth, only two possibilities—Mars and Venus. Of these, Mars has been the most publicized concerning the possibility of its being inhabited. We can study Mars much more readily than we can Venus because the atmosphere of Mars is very thin and our telescopes can penetrate to its surface. From the meager observational data at our disposal, we can construct the following picture of the surface of Mars. Most of the planet consists of bare red rock, possibly broken, and possibly red sand. I like to think of this condition as approaching that of our painted desert in Arizona. At either pole of the planet we find water, congealed in the form of hoar frost. These polar caps dwindle in size with the Martian summer and consequently we have reason to suspect that liquid water is present on certain portions of the planet at some time during the year.

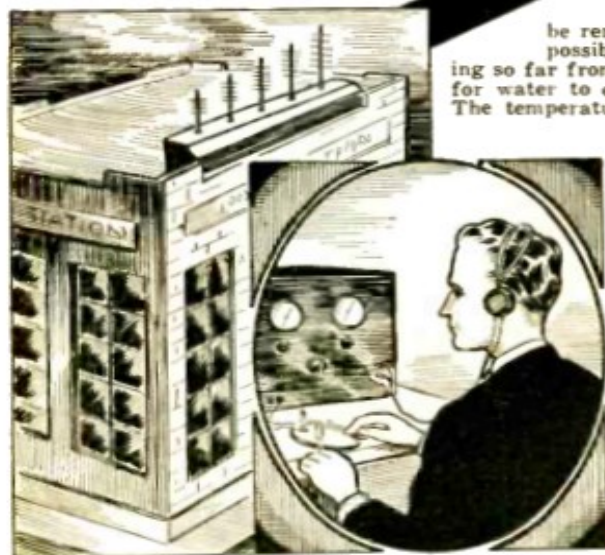
There are,

also, dark markings,

most prominent in the neighborhood of the Martian equator. The most surprising fact

is that these dark markings change in size and also in color with the season. Sometimes they are grey-green and at other times brown. The changing form and coloration could, perhaps, be explained as the result of natural causes. It has been suggested, for example, that the changes are due to the presence of dust which, on absorbing water, changes its reflecting power. This explanation is entirely reasonable, but I prefer to account for the changes as the result of vegetation. We can give no picture of Martian vegetation as the Martian himself would view it. We do not know whether the vegetation is in the form of trees, shrubbery, or merely minute organism like algae. Of course, where vegetable life is found, animal life may also occur, but the general consensus of opinion is that no very high degree of intelligent life exists in our solar system.

The planet Venus presents another possibility. It is completely covered with clouds so that our telescopes cannot penetrate to the solid surface—if, indeed, it has a solid surface. It is conceivable that the entire surface of Venus is covered by an ocean. But our conclusions are mere conjectures and based on no rigorous scientific reasoning, save the fact that the terrestrial continents seem to have risen more by



Uranus, Neptune, and Pluto may also be removed from the realm of possibility. These planets, being so far from the sun are all too cold for water to exist in the liquid state. The temperature that has been found for Jupiter, the planet nearest to the sun of this group, is more than a hundred degrees below zero centigrade. The temperatures of the other planets are not far from that of

The picture at the left indicates that a veritable "power-house" would be required in order to transmit a readable short-wave signal to a planet such as Mars. Experts compute that probably 50,000 kw. would be required to send such a signal. A specially designed beam antenna would also be necessary.

by Short Wave?

Communication

By Dr. Donald H. Menzel

Associate Professor of Astronomy, Harvard University.

● The question of radio-communication with distant planets still holds supreme charm for all red-blooded radio experimenters. First, of course, is the question of the possibility of life existing on such planets as Mars, and we have asked the well-known authority, Dr. Menzel to answer this question. The amount of radio power required would probably be about 50,000 kilowatts; the wavelength possibly as low as one centimeter (four-tenths of an inch).

accident than by design. The atmosphere of Venus contains an abundance of carbon dioxide and no traces of oxygen have been found. Since vegetation on earth lives on carbon dioxide and gives off oxygen as a by-product, we might infer that plant life, as we know it here, does not exist on Venus.

As for life elsewhere in the Universe, no scientific data are available. We do not know whether planets are the exception or the rule. If planets are born as the natural genesis, as astronomers once thought, then the Universe might contain many abodes of life. But if the planets are formed as the result of a collision or a near collision of two stars, then planets must be rare, and life, accordingly an even rarer phenomenon.

Dr. Lee de Forest's Opinion on Signalling Mars

● IT has been quite conclusively demonstrated that ultra short radio waves, in the neighborhood of 5 meters or less, are ordinarily not reflected by the Heaviside-Kennelly and other refracting layers of the upper atmosphere but ordinarily traverse these. Especially is this true if the wave is directed vertically.

It is therefore probable that such ultra high frequency waves can be directed by means of a parabolic reflector in the direction of Mars, when that planet is near the zenith. The question then is—how much power would be required to transmit signals from such a source to the distance of Mars from the Earth?

Then comes the question as to whether or not the weak signals arriving could penetrate the very dense atmosphere surrounding Mars. Then admitting that a certain extremely small fraction of all projected energy should penetrate the Martian atmosphere, have the inhabitants of Mars a sufficiently sensitive detector and amplifier system to pick up these Earth signals? A yet more important question is whether or not Mars is inhabited by intelligent beings. Current astronomical evidence and opinion now seem to be overwhelming against the probability of there being any such life on Mars; however, there is sufficient contrary opinion to permit us to indulge, from time to time, in such idle speculation as I have here set down.

It seems certain that if Martians exist and are attempting to signal the Earth, there is not the slightest evidence of this fact.

If Radio Signals from Space Were Received—What Then?

The chances are, that radio messages to outside space can bring in only one reply: "Nobody home." But if we should, at some future date, receive bona-fide radio signals from outside the earth, what then? We could absolutely verify their extra-terrestrial character and perhaps even determine the actual source by means of direction finders. But could we hope to read the messages and enter into intelligible communication with beings on a distant planet? The archaeologists who read the Maya inscriptions had the advantage of knowing something of their origin, and especially of seeing drawings associated with the writing to indicate something of the nature of the text.

Don't fail to read Joseph Richey's technical analysis of the probable power required to send a signal to Mars. See page 452.

A message has come to us, to be definite, let us say, from Mars. It consists of dots and dashes. Phone would be of no advantage and interplanetary television unlikely in the early stages of communication, at least. We have recorded the message, have built powerful sending stations with directional antennae. Our own message to them has been repeated, although we know that it is unintelligible to them. But we understand that they hear us. How can we proceed to communicate with beings that have nothing in common with us earth-dwellers?

Nothing in common? That statement is clearly untrue. If we are in communication with one another, both

(Continued on page 450)



Fig. 1, above, shows drawing of Mars as it appeared on August 22, 1934; drawn by R. J. Trumpler of the Lick Observatory. This drawing shows the line-like "canals," the existence of which was suggested by the well-known astronomer, Percival Lowell, as evidence for "Life on Mars." Astronomers have not generally accepted Lowell's conclusions.

At right—What a Martian might look like, as visualized by Hugo Gernsback.



Nikola Tesla's Opinion On Martian Communication

● NIKOLA TESLA, one of the greatest electrical and radio inventors of all time, recently made the statement that he believed that he had heard signals from a distant planet, nearly forty years ago.

In about the year 1899, he was making a series of careful listening tests on short waves, when he heard a series of signals which had a peculiar measured cadence, and which were repeated many times. Dr. Tesla's interpretation of these signals was that they spelled out—"1-2-3-4," etc. It is his opinion that if these signals had been sent by Martians, they had used numbers in an attempt to establish communication with the earth, for the good reason that numbers constitute a very broad universal language.

Dr. Tesla was one of the earliest investigators of short-wave phenomena, and, about fifty years ago—even before the year 1890—he was producing short-waves in his electrical demonstrations by means of his high-frequency Tesla coil. Without a shade of doubt a great part of the credit of the early establishment of radio should go to Dr. Tesla. His early patents and scientific papers establish a record of the remarkable work he did long before the dawn of the century. His opinion on the possibility of communicating with Mars is, therefore, of more than usual interest.

Daniel Romila VE7LCG

Daniel's Workbench

The cheap SDR offer for ham radio

This article is about receivers and transceivers using SDR technology and cheaply available on various online websites. I intentionally do not mention the more professional (and much more expensive) brand name transceivers.

SDR means software-defined radio. In SDR component blocks are no longer implemented by hardware, but by software. More than that, the block schematic is no longer the same as it was in the pure hardware implementation. Do not expect to have the same schematic in an SDR dongle as it was in a classic superheterodyne. It is more like a dedicated integrated circuit capable of fast analog to digital conversion, software processing, and digital to analog conversion.

variable capacitors. If you watch YouTube videos when they are disassembled, even those classic looking radios have a precision potentiometer instead of variable capacitors, no coils, no filters, and a DSP (digital signaling processing) chip as the main component.

The cheapest entrance in the SDR world is by an SDR dongle. They look like the one [left], or:



Or even in a mini version [below],

They are used for ham radio purposes, but they are not meant for ham radio purposes. They were meant to allow laptops to receive TV broadcasting and FM broadcastings in various regions of the world. They do not work with the North American standard. They cannot be used as bought for ham radio purposes.



I need to take a break from the subject of this article here and underline that NO, even inside a classic old-style looking receiver that one can buy from Chinese websites nowadays, you would not find the classic superheterodyne and

To have some use of them for ham radio, one has to install specialized drivers. A general article about this, called “Signals Everywhere (...)”:

<https://www.rtl-sdr.com/tag/zadig/>

A short and step-by-step guide on how to install the drivers:

<https://www.rtl-sdr.com/tag/zadig/>

Of course, the operating system has a different opinion, and Windows 10 installs different drivers for those dongles, drivers that do not work for ham radio. So, the operation of installing the right drivers means replacing the drivers that the operating system installs and constantly wants to re-install. The dongles are based on the R820T2+RTL2832U Chip (the R820T2 chip itself is no longer in production since 2018). RTL2832 is made by Realtek and allows reception from around 24 MHz to above 1.7 GHz.

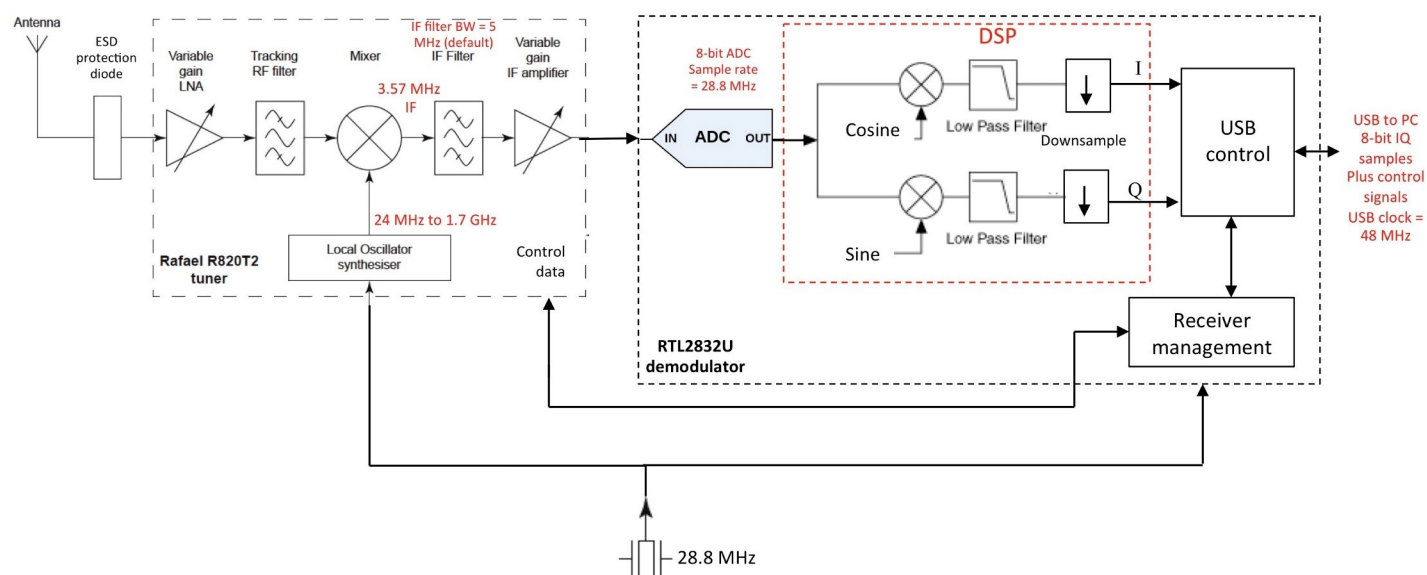
The block diagram, as described by KG7PSD, Aaron Scher in http://aaronscher.com/wireless.com/SDR/rtl_sdr_info.html [below] has an initial classic conversion, but it does not continue with a classic superheterodyne chain.

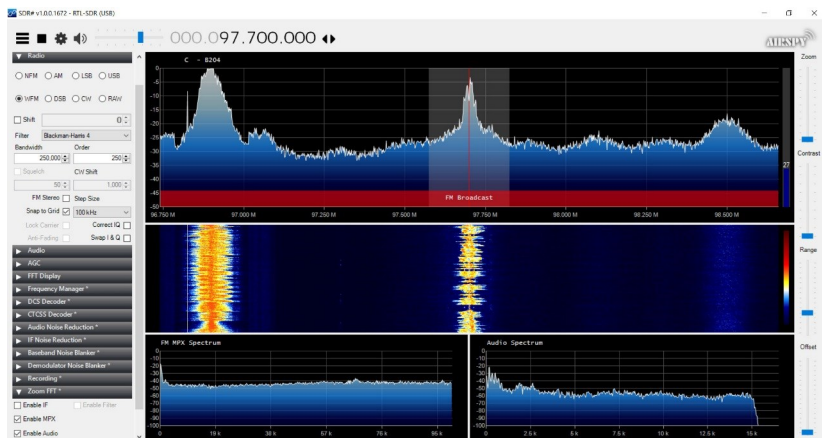
After installing the drivers one still needs to install some software, to use the dongle for receiving ham radio transmissions and even FM stereo broadcasts. There is a dedicated website for all kinds of software related to SDR dongles based on the RTL2832 chip:

<https://www.rtl-sdr.com/>

My favorite software package for my mini SDR dongle is SDR sharp. Most difficult for me was to make this program work. I expected that once I double-clicked the SDR# icon it would start by itself. The program, with its interface, started indeed, but there is a separate button in the upper left corner for starting the SDR dongle.

Those dongles are OK. They are not ultra-sensitive; probably around 1-2 microvolts sensitivity. Inside they have switching power supplies. They receive a lot of images of strong FM broadcasts. What is in the middle of the screen is always noisier than the frequencies on the left and right sides. The FM stereo reception is OK, but the audio quality is not great, because those dongles, by design, do not have enough bits for the analog-digital and digital-analog conversion. So do not expect an FM radio broadcasting quality as one would have from a commercial receiver.





It allows me to have a quick look at the main repeaters from the 2 meter and 70-centimeter band. It works in SSB and CW, too. Various plugins allow CW decoding and all kind of settings and memorization of frequencies and settings.

Because these dongles do not go down to the majority of shortwave ham radio bands, people developed all kinds of converters for them, usually without any filter at the input. A 125 MHz crystal generated signal is usually mixed with everything entering from the antenna and thrown at the SDR dongle. It does not work. It is a gizmo. There are so many commercial broadcasts and parasitic signals that it cannot work.



I won't mention prices here because I do not represent any of the websites and sellers, and because the prices in October 2020 are now 5 - 6 times more than what I paid several months ago. Also, it seems the prices for Canada have now added expensive shipping, which does not happen for other countries. I hope that is only temporary.

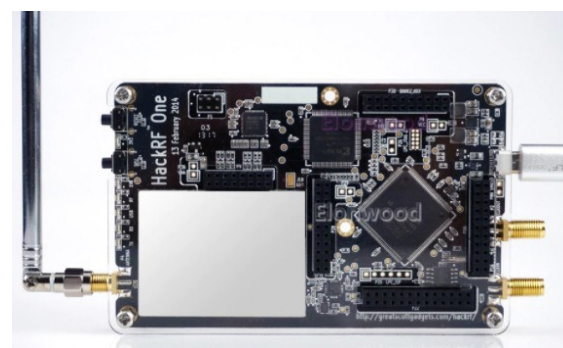
Another well known SDR choice available is the HackRF platform, which is not exactly a full transceiver, and it is not intended to be a transceiver. To use it as a standalone toy one needs to buy the HackRF together with a porta pack and case [top right].

That is already over C\$200. The HackRF board [below] is cheaper, but it requires a computer or at least a Raspberry Pi board to use it.

It works between 1 MHz and 6 GHz. More information can be found at:



<https://greatscottgadgets.com/hackrf/one/>



A standalone SDR receiver is the Malachite (Malahit) radio, [left] capable of receiving between 50 kHz and 200 MHz in the unregistered version and up to 2 GHz in the registered version. The registered version is the same hardware, and it requires just the introduction of a code to become fully capable.



The difference between the registered and non-registered version is over C\$100. There are various versions, with or without a case, for under C\$100.

An in-depth review, with text, screenshots and video can be found at:

<https://swling.com/blog/2019/11/the-new-malahit-dsp-a-portable-all-in-one-wideband-sdr-receiver/>

The forum for it, in Russian, since it is Russian originated:

<http://hamforum.ru/viewtopic.php?t=193>

A more expensive toy to experiment with is GNU Radio AD9361 RF 70MHz -6GHz SDR. It is around C\$700.



When we start talking about such prices you can think about buying a fully functional SDR transceiver, with battery, 15 W Tx power, microphone and it is ready to use.



The above is a picture of the model RS 918, and the more recent RS 928. It is under C\$500, shipping and taxes included. They are the Chinese versions of mCHF. A recent 2020 video review of this transceiver can be found at:

<https://www.youtube.com/watch?v=XxravMjhP5U>

Xiegu manufactures SDR transceivers, with auto-tuners in them, for HF, under C\$600:



There is much other SDR equipment for ham radio use. I should mention here the not so present on Chinese websites Lime SDR receiver, which powers many other receivers available online in many countries in the world. (Aliexpress.com has it). Apart from the Chinese websites they can be bought on Amazon, eBay, and many, many other websites. Most probably the sellers are the same and only the selling platform/website is different.

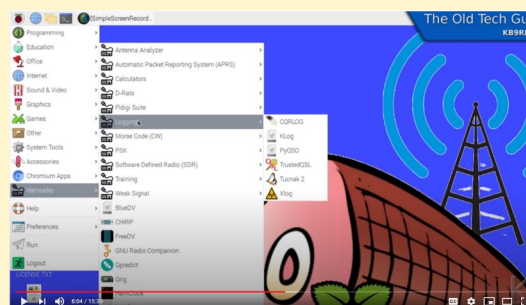
~ Daniel VE7LCG

HamPi

A complete Amateur Radio programs image by W3DJS for the Raspberry Pi computer module

If you want to have a very small and very portable computer to use or interface with your transceiver, this is surely the one. It includes an amazing number of Ham radio programs.

<https://youtu.be/vrN55ZwZikQ> and [Home · dsloetter/HamPi](https://www.dsloetter.com/HamPi)
[Wiki · GitHub](#)



Daniel Romila VE7LCG

Daniel's Workbench

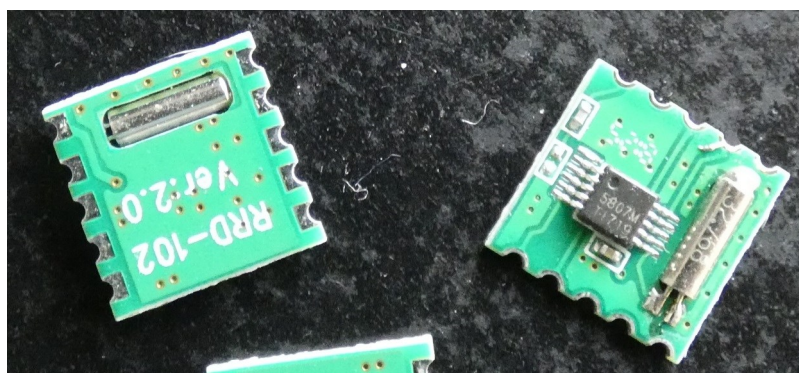
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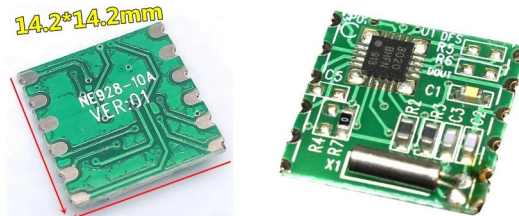
Mounting radio modules on boards

There are many high-performance radio modules available, including shortwave capable, that can be used in Arduino projects.

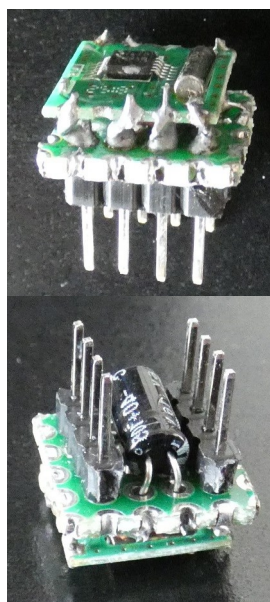
I had to mount a Chinese version of SI4730 on such board this time:



14.2*14.2mm

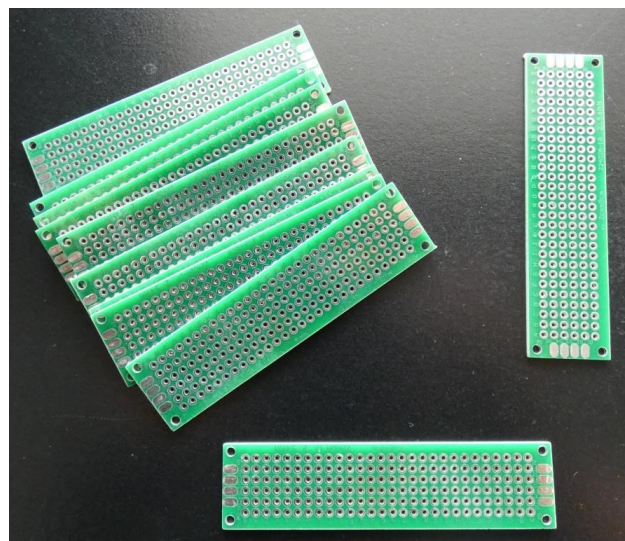


This radio module has 6 connections on one side and six on the other. The support I use is cut from double-sided test PCB boards:

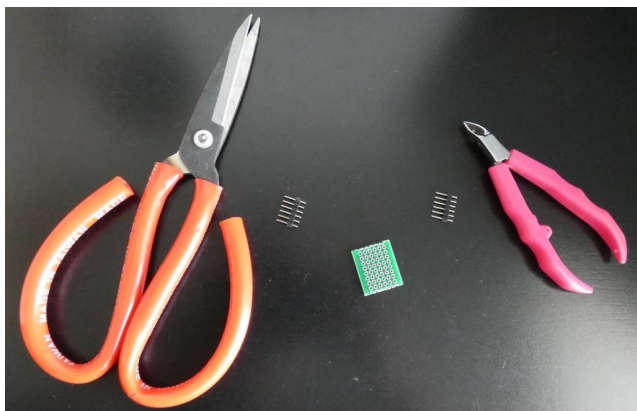


They have double-sided copper pads. From my experience, they can be soldered just several times and they fly away after, and the module is damaged. It is true those modules are very cheap, from C\$0.52 for an RDA5807M to less than C\$4 for those modules capable of receiving shortwave, too. Still, it is not only about damaging the modules, but also about having them in solid and stable shape.

This article intends to show how to get from the above raw modules to something usable in Arduino projects, on breadboards or PCB:

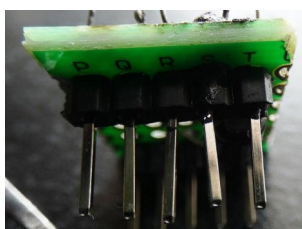
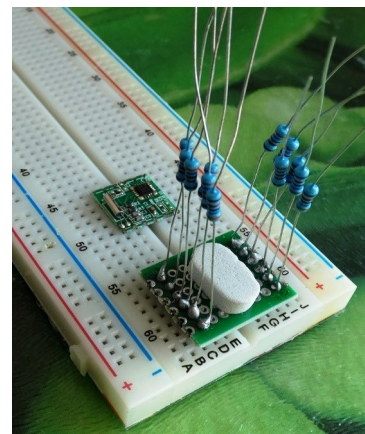


Strong scissors are necessary for cutting the PCB. The pin header I cut with pliers.



Now the PCB and the pin headers are mounted at 90 degrees. When I solder the headers I also solder the wires required for the connection with the radio module. I use resistors that I will cut afterward.

I also use a plastic pad in the middle, to establish the height for the radio module above the support board. This also makes the whole assembly more stable and strong after cutting the wires at the end.



I will have 6 pins on one side and 6 pins on the other. Soldering them to a 90-degree angle is a problem. The pin headers tend to melt and crook the plastic, and also to become misaligned, some shorter and some longer.



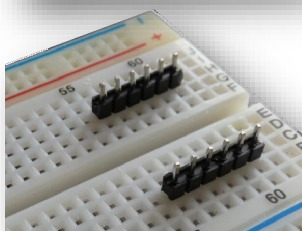
From my experience it is not possible to just put the pin headers in the prototyping board and solder them.

I always finish with a visual inspection and a mechanical inspection, to be sure there are no short-circuits and that the wires are well soldered at both ends.

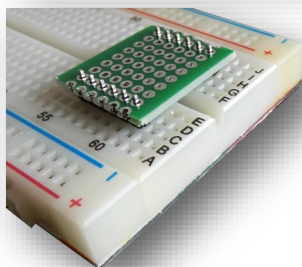
One must be a little crazy to attempt such things as described in this article, and even crazier to succeed. It works for me all the time (LOL).

The aesthetics can be improved, but what I do is rock solid and can be moved from one project into another and experiment with again and again.

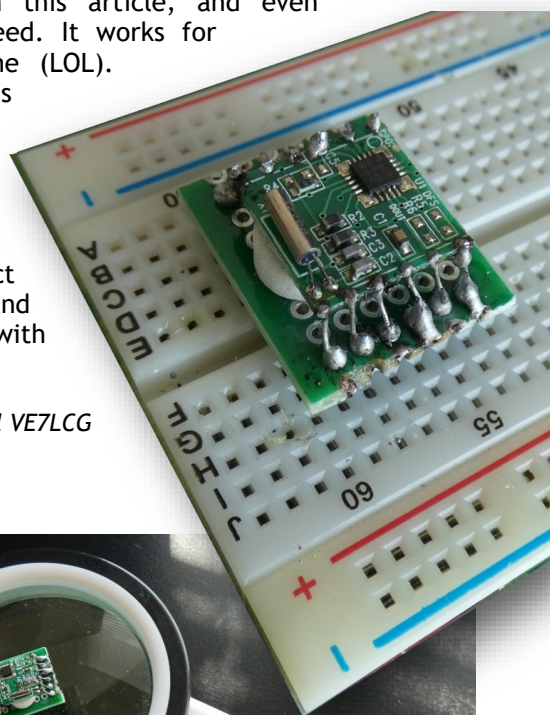
~ Daniel VE7LCG



I found it useful to use a piece of the breadboard as soldering support.



I placed it on top of the support PCB.



Daniel Romila VE7LCG

Daniel's Workbench

...continued



Running Ham Radio Android Applications on PC

There are Android applications I use which do not have a Windows equivalent. Some are simple electronics calculators I play with just several minutes at a time. One I use for hours and hours is, for example, RepeaterBook:

RepeaterBook
CN89NF - 200 km
3.4 km, South West, DMR
VE7NWR
444.60000
4.2 km, South West, FM
VE7NWR
145.39000 100.0
4.7 km, North East, FM, IRLP
VE7MFS
145.31000 127.3
5.4 km, South, FM
VE7MAN

It is convenient because I can sort repeaters by frequency, by callsign, or by distance from my location.

Several times a year I program my walkie-talkie and I put in its memories all repeaters in the area that I can reach, in 3 bands. That is almost 100 repeaters (96 last time). I do the programming on a Windows PC. Switching back and forth between an Android device and my Windows desktop is painful, especially if I go back and forth around 100 times. I do not use a cellphone, because I have a 9.7

inch Samsung tablet, but it is still painful. So, it would be more convenient to do all operations on a Windows PC, preferably with two monitors.

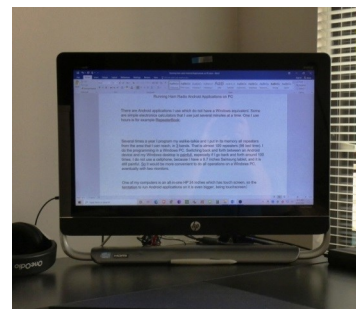
One of my computers is an HP 24 inch all-in-one that has a touch screen, so the temptation to run Android applications on it is even bigger, being a touchscreen.

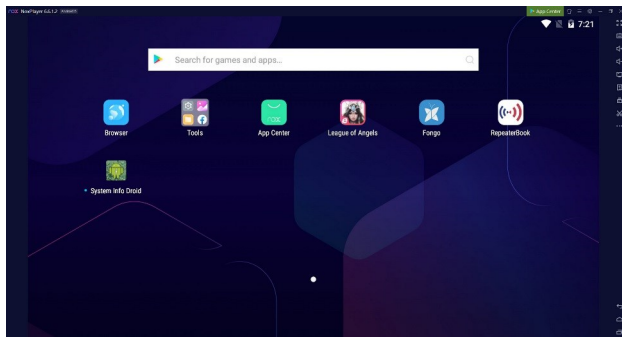
I've been using Linux and Android emulators for more than ten years now. I am also constantly playing with (and abandoning) VMWare and [Virtual Box](#), which are specialized programs for running virtual machines (computers inside

computers). Such specialized programs allow me to even run Windows 10 on a Windows 10 based computer, Linux, and other operating systems. But this article is about simpler things, which can be freely downloaded and installed, and run immediately afterward in the Android application, like in a cellphone.

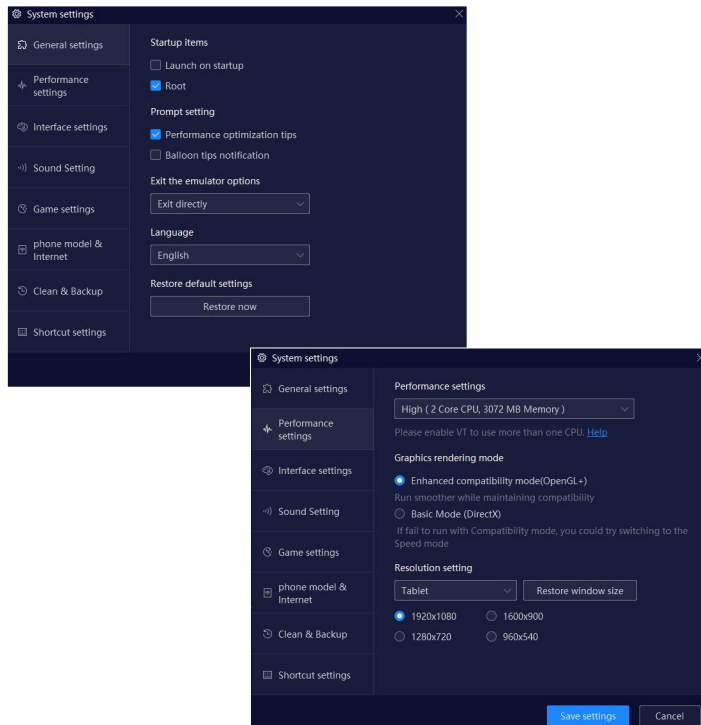
Everybody is praising the emulator called BlueStacks. It is touted as the best emulator out there, while I dare to disagree. It is bogged down with so many ads and messages, that it is annoying and sometimes unusable. This aspect seems to get worse and worse with each version. Now it runs Android 7 and it can be freely downloaded from <https://www.bluestacks.com/>. Its creators declare 97% of all Android applications from the Google Play store can be run inside the BlueStacks emulator, which is very good compatibility. Nothing achieves 100%, not even "the real deal", your cellphone.

I am tied between declaring Memu or Nox as my favorite emulator. They look pretty much the same, and I would not be surprised to find out they are made by only one team of developers. Even those praising BlueStacks immediately put Memu and Nox after, so I am not a singular voice when I write this article. Let's start with Nox.





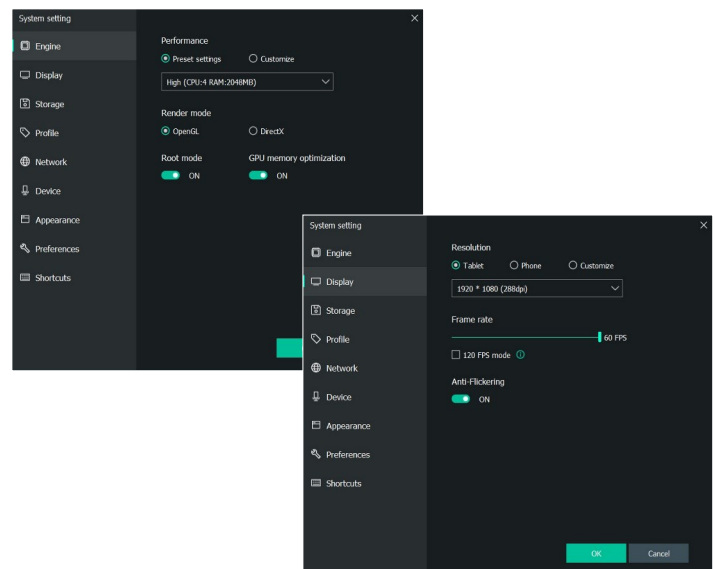
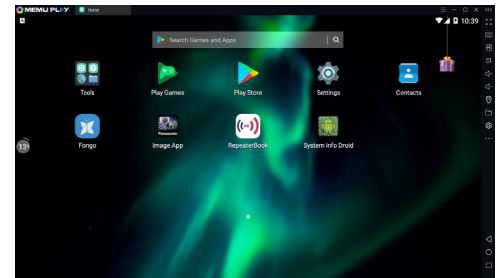
It runs Android 5.1.1. It is a little outdated, as an Android version, but it proved to be capable of doing everything I needed. I very much like the option to run it as root, set the emulator graphic processor and the desired display resolution.



I installed System Info Droid and it indeed says that I am running Android 5.1.1, with the processor that is in my PC, and the emulated device is a Samsung SM-G955N. Expect a very good speed for running Android applications inside this emulator, and this kind of emulators in general. The resources are split between the real computer, running Windows, and the emulator that runs on top. If you have a real powerful Windows computer, with a modern processor, expect things to happen even faster than on your cellphone.

The MEMU emulator is similar to Nox.

The emulator's settings are similar to what Nox has, presented in a different order.



System Info Droid reports the emulation of a Samsung SM-G935W8 device, Android 5.1.1 (same as Nox). It is fast.

Another emulator worth mentioning was AMIDuOS. It was discontinued in 2018, and it had a trial version and a paid version. If you can get it somewhere, try it. It is different than the others because it is oriented towards a Windows user to give a Windows-like experience, and it is not ashamed to show it off. While running Android applications, it is optimized for external keyboard and mouse, and it does not even try to keep an Android look and feel. It has different versions, for 32 and 64 bits, for Android 4.4 and Android 5.1.1 versions. All versions are now free since it is discontinued and no longer sold.

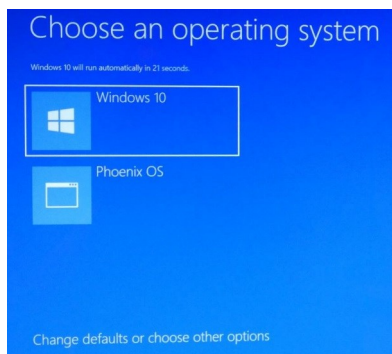
It was fun in its time, with a clear separate setup of the emulated machine, but now, in 2020, I feel more comfortable running Nox or Memu. Actually, I should put Memu first, in its last incarnation. After the update, I feel it's a little more friendly than Nox with just minor differences.

For the hardcore Android users that want to have a big screen and an Intel or AMD kind of processor, plenty of RAM and whatever sophisticated graphic card that make your friends cry with envy just hearing its name, dual boot is the way to go. That puts Android as a native operating system, and when you boot the computer you have to choose between booting in Windows or Android.

I successfully installed Phoenix OS, which brought Android 7.1 to my computer; downloaded freely from:

http://www.phoenixos.com/en/download_x86

The installation is done in Windows, like a Windows application. I was generous with the fixed space for Android since it is not possible to expand it afterward. After the installation was finished I rebooted the computer, and I had to choose:



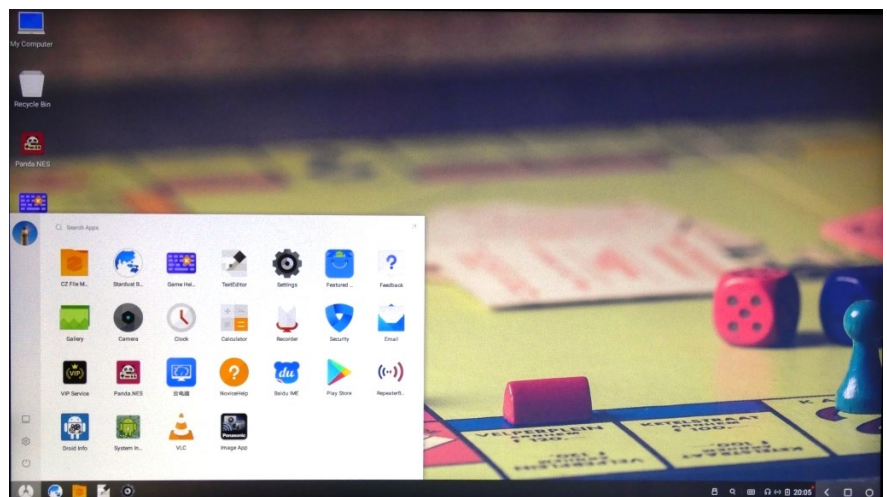
The free Phoenix OS is based on the free Android-x86 project, which is Android for Intel-compatible processors (and AMD).



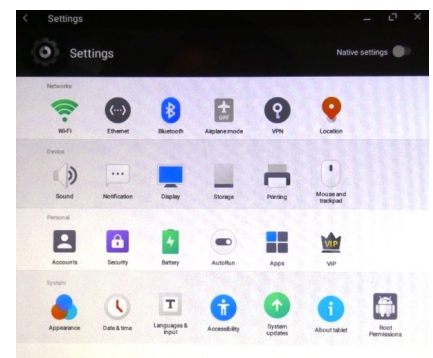
It booted without any problem on several computers on which I tried it. The home screen is very Windows-like and is also very Linux like.



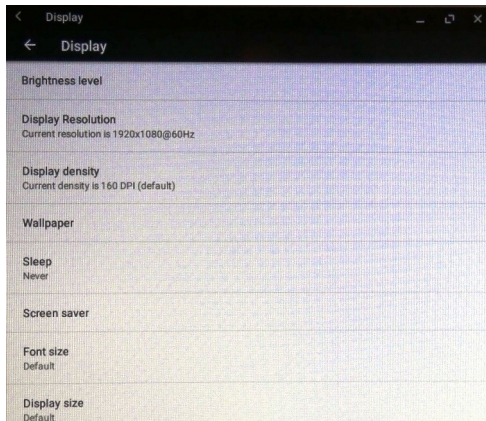
Even the icons on the screen and the position of programs look like the Linux distros of today.



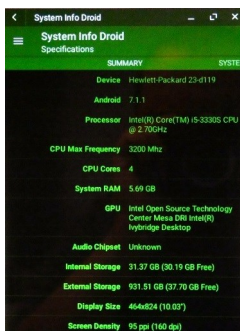
Settings are straight forward.



For example, for the display:



I installed System Info Android, which reports:



This is the way to go if you want a fast Android device. The disadvantage is that one can go into Windows only after rebooting the computer as there is only one operating system available at the time, while with Memu and Nox one never leaves the Windows operating system, and the Android emulator can be minimized on the taskbar.

Similar to Phoenix OS (dual boot) is Remix OS and Bliss OS. I wanted very much to make Bliss OS work because it brings newer versions of Android (above 7), but I always failed, no matter what I did. There are many other Android emulators, some specialized for developers, and some for various other purposes.

The presence of an Android emulator like Memu and Nox became a fixture for me. Instead of trying a new application on a cellphone or tablet, I try it first on the emulator. If it crashes the emulator that's fine because I can uninstall the whole emulator, and install it again. Losing the tablet would be a tragic event. Now I am brave enough to try whatever ham radio application is out there, even if I am the only user to try it.

~ Daniel VE7LCC

I was asked by an early reader (Gerard de Veer PD0GIP) if it is possible to just install the Android operating system as standalone and have multiple monitors. The answer is no.

I downloaded primeos_standard_0.4.5.iso from: <https://primeos.in/download/>

I used Rufus 3.12p to put the ISO onto an 8 gigabytes USB stick. I booted from the USB the laptop, and when I had the PrimeOS screen I chosen "CD live" (PrimeOS live, without installation).

I tried this on a laptop, and PrimeOS did not have any settings for 2 monitors, only for one. PrimeOS does not work independently with 2 monitors; it just mirrors the same on all connected monitors.

To the best of my knowledge, all those distros, like PrimeOS, are based on Android x86, so if Android x86 does not know how to access multiple monitors (like an extended desktop), the distros based on it will not know either. I could not find 2020 info, but the 2019 info says multiple monitors do not work yet, and it was on the "to do" list. See the screenshot [right].

~ Daniel VE7LCC



A quick check of android-x86.org shows at the bottom:

- Development (2019/10)
- What we are working on now
- Android 10 (Q release) porting (q-x86 branch)
 - Upgrade kernel to 4.19 or newer
 - OpenGL ES hardware acceleration for intel/radeon/nvidia/amdgpu (pstgila, mauro) and virgl(roth) GPUs.
 - HDMI audio (owhuang)
 - LineageOS integration (jlm)
 - Hardware accelerated codecs
- To-Do List
- Multiple displays support
 - Better power management
 - Miracast

So the feature **Multiple display support** is on the **To-Do List** and probably dependent on OpenGL ES hardware acceleration efforts.

So as of 2019-10 the feature you want isn't available.

Daniel Romila VE7LCG

Daniel's Workbench

...continued

Buying Online



Buying online was a way to save money even before COVID19 time. It was and is even a necessity - the only way to buy - for many electronic components like transistors and integrated circuits, because the electronics specialized traditional brick and mortar stores are few and in few places (if they still exist).

For many people buying online means [Amazon.ca](https://www.amazon.ca). Also, for many people, Amazon is associated with employee exploitation. See “‘I’m not a robot’: Amazon workers condemn unsafe, grueling conditions at warehouse”, from “The Guardian”:

<https://www.theguardian.com/technology/2020/feb/05/amazon-workers-protest-unsafe-grueling-conditions-warehouse>

Just for fun, see how Amazon uses the tips received by delivery employees to pay their base salary: <https://www.theverge.com/2019/8/22/20828550/amazon-delivery-drivers-tips-end-base-salaries-flex>

This reminded me of some Eastern European practices, where the waiters are not paid by their employers (is any employer paying the waiters they hired, anywhere in the world?

LOL); more than that, the waiters pay their employers to be allowed to work there, and continuously bid to obtain and keep their “job” - LOL.

Anyhow, such discussions can be argued pro and con, and they are not the subject of this article.

I would like to underline that buying online means using a *software web platform*; Amazon is not a manufacturer. Accordingly, many known chain stores, like Walmart and Best Buy, could become and indeed became such *software web platforms* for sellers and products that cannot be found in their brick and mortar stores.

The meaning of the above is that if you buy a certain product, most likely made in China, it is exactly the same product, whether if you buy it from Amazon, eBay, Alibaba, or Walmart online. perhaps the price is different, or the intermediaries on the sales chain are different, but the product originated from the same manufacturer. I wanted to say that because some radio amateurs told me they buy only from amazon.ca, because “they buy Canadian”.

Although it is Canadian sold, most probably it is not Canadian made.



When buying online, I am looking for:

- The lowest price
- The delivery time
- Return and dispute policies

1. The lowest price

Many buyers look only at how much the item costs, but in the end, there will be added shipping and eventual taxes. If you buy in a different currency than the currency which is your method of payment, additional costs can occur. For example, I use a credit card in Canadian dollars. Every time I buy from Amazon.com I buy in American dollars, not in Canadian dollars. So the bank is charging me an exchange fee, which is sometimes bigger than the cost of the item I buy. The bank transforms CAD into USD not at the international exchange rate, but at the bank's sell rate, which is always a disadvantage for the buyer. Those costs are not seen upfront; you will see them on your credit card bill, totally unrelated to the website selling platform. Amazon, Walmart and Best Buy add taxes, while the Chinese websites do not.

2. The delivery time

Yes, I buy things and when they finally arrive I no longer remember what I wanted to do with them. It takes around 7 - 14 days for goods to arrive from China to Vancouver postal facility. I live in a suburb of Vancouver. It takes between 2 weeks and more than a year to get the goods from the Vancouver Canada Post facility to my mail box in Vancouver. According to several postal workers, all goods coming from China have the lowest possible priority, and they can linger forever in their facility, due to the high volume of parcels.

I just wonder if Canada Post would still exist without those parcels coming from China and if their employees' union would be able to stop mail delivery indefinitely as they did starting September 14th 2020 ("Because Canada Post suspended service due to health risks from smoke wafting in from Washington State wildfires." - see <https://www.vancouverisawesome.com/vancouver-news/canada-post-metro-vancouver-deliveries-smoke-2712614>)

In conclusion, regarding the delivery time, if it comes from China, expect long delays whatever the web buying platform you use, whether Alibaba/Aliexpress, Best Buy, eBay, or Amazon. Sometimes Amazon uses its facilities and its own delivery for some products, and parcels may get to buyers faster.

3. Return and dispute policies

Buying things that proved to be garbage has happened to me several times. They were totally different than described. My only advice is not to start any kind of negotiation with the seller. You bought from an online web selling platform. Amazon is very good with these kinds of situations. Aliexpress is also very good.

The selling platform has its own policies for refund (total or partial) and eventual return. Sometimes returning goods costs more than the goods themselves and sellers might take advantage of that. But the online buying platforms also know about this practice, and usually act in favor of the buyer. I repeat here that entering into negotiation with the seller is a stupid thing to do; just follow the online selling platform procedures. An honest seller would also recommend you to do the same as I am writing here.

The starting point for buying online is to have a method of payment that you can use. A prepaid Master card or Visa card are the best. From Visa's website I took a picture, which is just a sample card, not a real one [right].

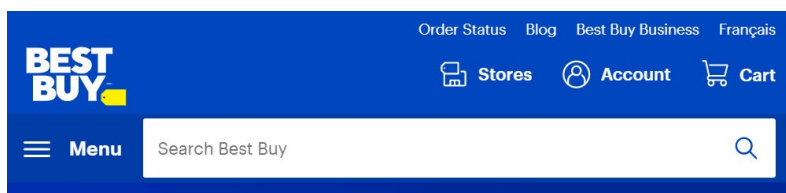
As you see above, I am talking about a prepaid card that has your name on it, not an anonymous card with pre-loaded fixed amounts on it. Having a separate credit card just for online transactions keeps you safe. Even if somebody hacks your computer/card, what they can steal is only what you have loaded on the card, no more. And because of not having plenty of transactions it is easy to "pop-up" a fraudulent transaction not belonging to you. It takes around 3 days to load



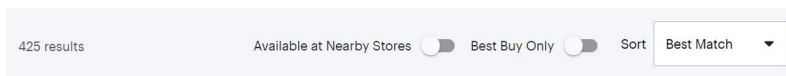
such a credit card (which is not a true credit card) from a normal bank account into the credit card's online account. You send the funds, and in around 3 days or faster, you see them on the credit card (the banks need some time for processing). It is cost-efficient because you pay a card fee once (usually, not fees all the time you use it, load it, and so on - as is the case with anonymous gift cards). Maintaining such a card is under C\$7 a year at some big banks. Shop around.

The Master and Visa cards are accepted everywhere. The next step is to read the procedures from the websites you want to use the card on for buying goods. Many users read the procedures only when they have problems, which is not the best thing to do. And it is necessary to create an account with the online selling platform. Even if the platform allows occasional buying without having an account, it is still better to make an account. In this way, there are written traces of all transactions, and you might need them. Also, the buyer gives the details of a credit card that it is not a true credit card, but a prepaid one, so not much danger there.

Best Buy offers a long list of products, even ham radio related products (let's say headphones, microphones, and computers for EchoLink, are at least related).

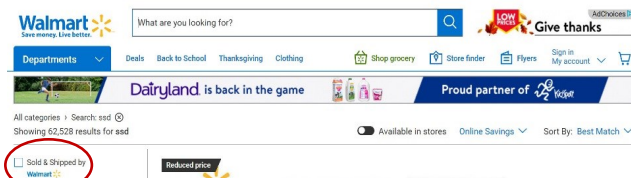


As you see above, there is the opportunity to place various items in the online shopping cart, sign into your account and even verify the Order Status. One should pay attention to some products that are sold through the Best Buy online platform, but not by Best Buy itself, so other return and dispute policies can be in place.



If you are not comfortable dealing with somebody who is overseas (many people do not understand that buying from Best Buy online means also

buying from very far away) put the Best Buy only button in its ON position. Similar for **Walmart**, which has a very discrete and easy to ignore button on the extreme lower left of the following picture:



Forget to click the “Sold and Shipped by Walmart” button, and you might simply buy from thousands of kilometers far away, with added Canadian taxes. If you go to the American Walmart.com it is even more necessary to pay attention, because everything is in USD, not in CAD.

At least when you buy from **Amazon** you are warned the seller might be very far away and difficult to reach. Count on Amazon's procedures and negotiate everything with Amazon, not with the far away seller. Amazon.ca sells in CAD and ads and taxes are in CAD.



Unfortunately, the Canadian subsidiary and other national subsidiaries have less products than the American version of Amazon. It is easy to know on which Amazon you are, because Amazon.com is the American one, with prices in USD. There is a fast pre-paid delivery option “Prime”, which costs more, and it is not available for all products. So you pay an annual subscription to have this Prime service, and when you buy things some enter in the fortunate category of being available for fast delivery, and others not.

Many people want to buy from the biggest online platform in the world, Alibaba. From napkins to Boeing planes, you can buy anything from Alibaba. But this might be inconvenient if you are a private person, not a business, and you want to buy only one piece of something, not a whole lot with a minimum required amount:

\$100.00-\$500.00 / Piece
10 Pieces (Min Order)



Sell on AliExpress | Help | Buyer Protection | App | English / CAD | Wish List | Account

AliExpress
Smarter Shopping, Better Living!

cb radio | All Categories | Search | Cart



Ship to
Canada

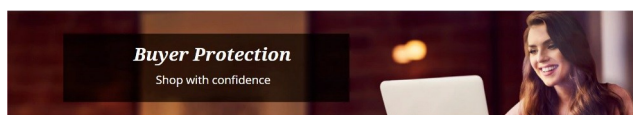
Language
English

Currency
CAD (Canadian Dollar)
Search
USD (US Dollar)
AFN (Afghan Afghani)
EUR (Euro)
ALL (Albanian Lek)
AOA (Angolan Kwanza)

Alibaba section for private persons is aliexpress.com

What it is immediately visible under the pink banner are several drop-down menus. For example, I choose my location as Canada, I want to see everything in English and I want to buy and see the prices in CAD. But I could have chosen the Albanian lek instead of the Canadian dollar because

aliexpress.com is happy to accept my money, whatever currency I might have:



Buyer Protection
Shop with confidence



MONEY BACK GUARANTEE

We promise your money back if the item you received is not as described, or if your item is not delivered within the Buyer Protection period. You can get a refund 15 days after the claim process finishes. This guarantee is in addition to and does not limit your statutory rights as a consumer, as granted by all mandatory laws and regulations applicable in your country of residence.
[Terms & Conditions](#)

1. Contact Seller
2. Apply for Refund
3. Get Money Back in 15 Days

Another button under the pink ribbon immediately accessible is “Buyer Protection”

This is something to read. I stand by everything that is written there because I’ve had many disputes. If I did not receive the item; I opened a dispute; aliexpress.com gave me my money back. Sometimes, after one year, Canada Post finally decides to deliver the item. I contacted the seller, and re-purchased the item from the same seller, for the same price, and I mentioned “do not send - payback for REFUND order 123212331”. I’ve never lost money in more than 4 years of buying from aliexpress.com. It has

happened that I was not 100% satisfied with a product, but not through a fault of the partial refund policy, and you have to live with it. Many products I buy are under C\$1, shipping and taxes included. So not a great loss.

I should mention here that Canada Post never confirms that goods entered in Canada. Never. In this way, Canada Post cannot be accused of anything. For example:

It left China, by air, several weeks ago. I really doubt China sent it on to another planet, for the C\$3.22 I paid. Most probably it is already in Vancouver, but Canadians never confirm they have the item. It will arrive in my mailbox, and Canada Post will still never acknowledge the parcel arrived at the Canada Post sorting facility.

When using aliexpress.com, ignore any message after you’ve already paid for the product. Some sellers ask for more money afterwards, due to COVID 19 causes (LOL).

Just ignore any additional money request. If the parcel does not come within the allocated time, ask for a refund, and buy again from somebody else. No negotiation whatsoever with the seller. Only with aliexpress.com. The seller may try to fool you to wait for a date when you can no longer open a dispute on aliexpress.com. If you are such a sucker, maybe buying online is not for you (LOL).

The user account for **Alibaba** and **Aliexpress** is the same. You can log in both sites with the same credentials.

In the past I’ve used many other Chinese websites. Smaller online selling platforms tend to be more expensive. I’ve had good experiences

Awaiting delivery | Track Order

Tracking number: UW631814531CN

● Depart From Original Country

【8】 Hand over to airline
2020-09-08 15:49:59

【8】 Outbound in sorting center
2020-09-03 16:42:42

more logistics info [Click here to view more.](#)

Order Number #8117597908523456

Portable Universal Adjustable Camera Shoulder Neck Stra...
Awaiting shipment
US \$1.90

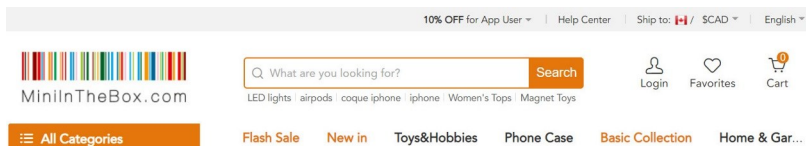
Production Information

Make Up Difference 3 Dollars For Shipping Cost
US \$3.00

with dxengineering.com



and miniinthebox.com:



Almost every single time I've bought from **banggood.com** I've regretted it. Banggood.com did not allow me to post negative reviews. So everything I have read about a product before buying it was deceiving:



I finish this article with the local website where the majority of local second-hand ham radio and CB equipment is posted, <https://vancouver.craigslist.org/>.

The majority of postings are real. The majority of sellers are honest people. But from time to time this website makes the news for scams, burglary, and other things you do not want to be involved with.

Buying online requires more attention than buying in the store, where people can usually return things and it is not so risky to lose money. I wish I could buy what I buy online, at the prices I buy online, somewhere in a nearby store.

~ Daniel VE7LCC

The COVID19 Net Meeting

They were gathering in the same teleconference Zoom room, the same hour, the same evening of the week. Consistent procedure was believed to be good for group role playing and group learning.

- I am net control this evening. We should start with important announcements and traffic.
- I need to go at the toilet.
- Jim is going at the toilet again. We should all be with him in this endeavor.
- No, thank you. I'm going alone.
- We should start with members from other clubs.
- I was in another club until this morning, at the moment I no longer remember which club I am in.
- We should all welcome Dave in our club.
- I am Smith and it is raining outside.
- I am Mandy and I burned some cookies too much today.
- And it is raining outside, do not forget that.
- I apologize. It is indeed raining outside.

The conversation continued peacefully. They were all students preparing for the ham radio net participant exam. They were practicing hard, every week, with the legitimate hope someday they will obtain an advanced ham radio net participant license. Jim came back from the toilet.

- I am Jim and I am an alcoholic.
- Hello, Jim. Here we say: "I am Jim and I am a licensed ham radio operator". We can even promote you to net control, if you prove to be talented. Try again.
- I am Jim and I want to tell you about the ten steps of ham radio.
- Welcome, Jim. That's much better now.

~ Daniel VE7LCC

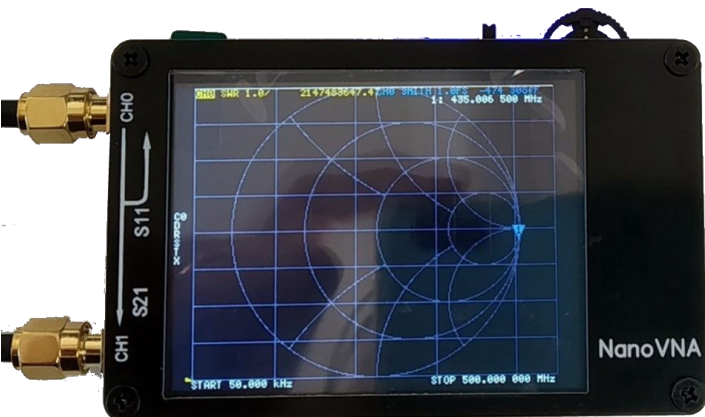
Measurements With The NanoVNA



Establishing the characteristics of unknown toroids

Arie Kleingeld PA3A

In part 4 of our series of "measurements with the nanoVNA" Arie shows us how to use the nanoVNA to identify unknown toroids.



Preface

In my shack is an IKEA container labeled "Ring cores". This one is full of cores and ferrite rods of all shapes and sizes that I am reviewing. They are the result of 44 years of amateur radio, gathered for all kinds of purposes. You immediately recognize some of those types. Those are the purple, the 4C6, or nowadays 4C65 types. Those were the ones you bought from the VERON Service Bureau to combat low-frequency interference to your neighbors. I can tell you that I now use completely different ferrites for this, but back then you could not familiarize yourself with that as much as today and the choice was not yet huge either.

There are cores of different colors in the tray and you can sometimes find out which type you are dealing with. Noticeable is that black and beige

occur very regularly, without any inscription, and for some cores, the color is difficult to see (bluish purple or purplish-blue, cream, or white).

In this article, I want to use the nanoVNA to identify the cores, and that is certainly possible.

Without immediately reaching for the measuring instruments, we see that ring cores have several external "properties". when you inspect them:

Measurements

Requirements:

The intention is to measure as practically as possible without setting up a complete measuring lab. For this article of course we will use the nanoVNA and a caliper. I also use the mini Ring Core Calculator (a free program). It is a nice piece of software with lots of data for different



cores that are neatly sorted and some handy calculation tools that you can use well.

You Must Measure and Re-measure:

Without a doubt, the easiest measurements are "post measurements". If you know what kind of core you have and you measure it, are you are satisfied when you are close with your results. It is different if you do NOT know what kind of core you have in front of you and you have yet to find out. This requires a somewhat more extensive approach because some cores have properties that at first look very similar.

Challenges:

Manufacturers publish specifications based on measurements with only one winding. This is related to it avoiding the capacitance between multiple windings and keeping the winding wire as short as possible. The length of the wire alone causes a phase shift, after all a piece of wire is a certain amount of long wavelengths. So measure with a short winding wire and at the lowest possible frequency. Without that the watchword is that the impedance measurement becomes unreliable.

- 1. Size (outside diameter, height, hole diameter)
- 2. Color coding or a layer of lacquer around it (few tenths of a mm thick)

A second challenge has to do with a picture of specs from the [Ferroxcube](#) manual [below left] (see reference).

There are many different cores. The example below shows the data of 4C65 material. Formerly with a purple color, nowadays they are often coated white (with a small purple dot on it if you are lucky).

We can extract three important measurement points from this to identify a core:

- 1. The μ_i , or the initial μ .

The μ_i is the relative permeability of the material, which is measured at a low frequency <10kHz (you are then dealing with virtually pure inductance and hardly any losses). For 4C65 it is 125 (+/- 20%).

- 2. The frequency at which μ'_s and μ''_s are equal. Looking at the chart:

Here μ_s is a direct measure for the calculation of the self-inductance L and the reactance XL at varying frequencies. For the low frequencies, this is therefore equal to the initial value μ_i .

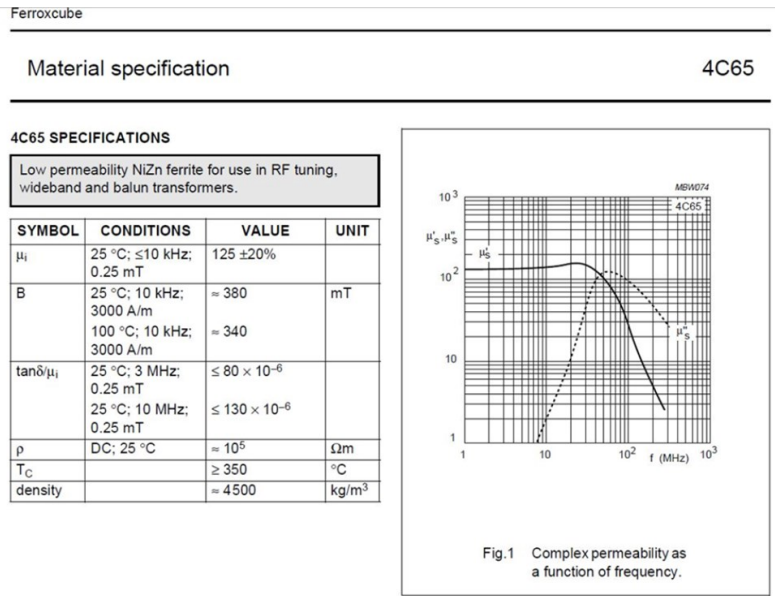
The μ'_s is a measure for calculating losses. These are expressed in a resistance value R.

Where the two μ_s are equal (and thus where R = XL) the ferrimagnetic resonance point is established (reference ON9CVD website). That is about 45 MHz for 4C65. You must therefore be able to use a high-frequency so as not to considerably increase or decrease the result from this point by MHz.

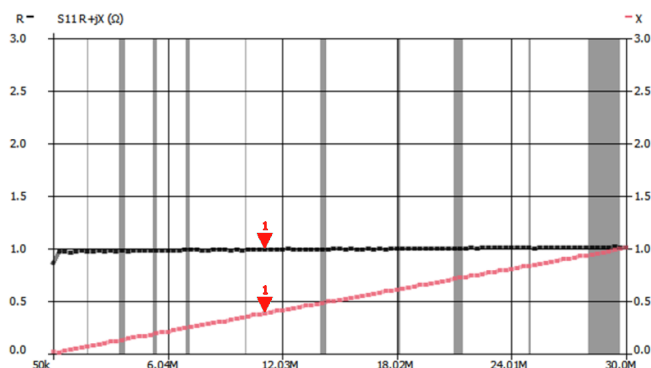
- 3. The value of the two μ 's at the ferrimagnetic point.

Above, that is at the intersection of the graphs with a value approximately equal to 110.

For the background of these measurement points and μ'_s and μ''_s I refer you to the articles and websites of Owen Duffy and Bob van Donselaar and the article by Mathieu Melenhorst who explain this very clearly (see references), and of course, the 'Soft Ferrites and Accessories Data Handbook (2013)' from Ferroxcube is a great resource. The latter contains numerous graphs and numbers of different core materials.



We make an S11 R + jX measurement with an ordinary "old-fashioned solderable" 1-ohm resistor. That then provides us the following image (from nanoSA)



We can see that the value of 1-ohm is displayed correctly over the entire HF range (between 0.97 and 1.01 ohm) and that there is a linearly increasing reactance. In nanoSAVER you can read that it is about 5nH, reasonable for just average resistance. We can therefore cautiously conclude that with a few percent measurement tolerance you can still measure sufficiently well up to 1-ohm.

In Practice

To identify a round toroid, we have to check several things:

1. The color (possibly a given if the color is in a table)
2. The dimensions of the core OD (outside diameter), ID (inside diameter) and H (height)
3. The self-inductance value per 1 winding measured at a low frequency (you then have the AL)
4. Calculate μ_i : Calculate using one of the tools in the Mini Ring Core Calculator. The operation of which you will see immediately in the measurement of core 1. The μ_i at least gives a first good indication of what toroidal material you are dealing with.
5. Determine the ferrimagnetic resonance point where $XL = R$ (ie where $\mu''s = \mu's$). This is especially achievable helping to find the right core with ferrites because the μ_i 's sometimes hardly differed from each other and where tolerances of $\pm 20\%$ are specified.

6. Determine the value of the μ 's in the ferrimagnetic resonance point and the variation at different frequencies.

If you compare all of these measurements to the manufacturer's specs, and it very closely resembles them, you may have found your core material through your identification measurements. Let's try that.

Ferrite Core 1

We start simple (well... simple) with a more or less well-known and widely used toroid core in HF land, a red T200-2. This one is made of iron powder. These types of cores are known to have little core losses in its working range so that with an S11 R + jX measurement the resistance R is much lower in value than the reactance X.

1. The color: red (logical)
2. The dimensions: OD = 51.0 mm; ID = 32.0 mm; H = 14.3 mm; thin red layer of lacquer (0.1 mm thick?)

So far so good, these are the color and dimensions of a T200-2 according to the data in the Ring Core Calculator.

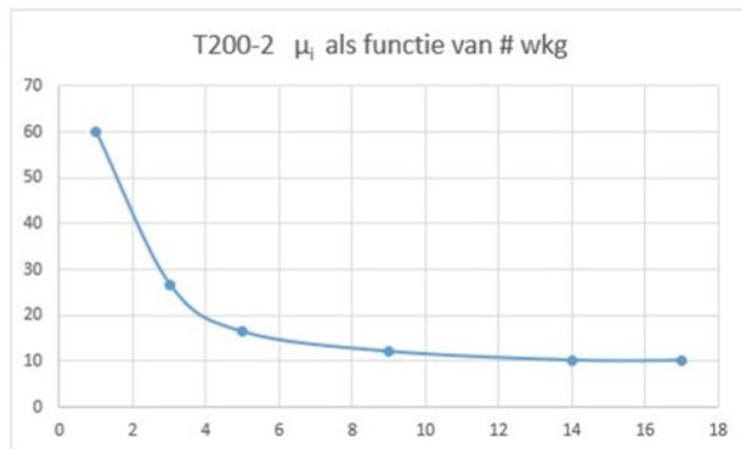


3. Now it is time to measure the number of nH for 1 winding (= AL value). That turns out to be a challenge because the impedance value for 1 winding is quite low and there is more to it as it turns out.

First measure via S11 through the core with a different number of windings to connect. The AL and μ_i turn out not to be as 1-2-3 simple as the expected values. The reason is that the low μ_i of the core causes the magnetic field to leak from the core. That is why we measure with different numbers of windings and we try to encircle the entire core. This is not possible with 1 winding, but with 4 or more it is already easier. The outcomes using the nanoVNA are surprisingly good. See the following table and graphic. We then end up in the neighborhood of $\mu_i = 10$, which in the specs stands for type-2 material.

T200 - 2

wkg	L (nH)	AL nH/N ²	μ
1	77	77	59,9
3	310	34,4	26,8
5	526	21	16,4
9	1251	15,5	12,1
14	2560	13,1	10,2
17	3760	13	10,1



Determine AL and μ_i

Turns: 14 Inductance: 2.580 μ H

wrapped measured

Calculating core parameters

OD: 81 mm ID: 32 mm h: 14,3 mm Coating: 0,1 mm

Ae: 128,9 mm² le: 126,0 mm $\Sigma (le/Ae)$: 1,0 1/mm

AL = 13,06 nH/N² μ_i = 10,2

Printing Exit

The values from the table above can be found using the “Determine AL and μ_i ” tool in the Ring Core Calculator.

1. The color: black; we can't do much with that, it's probably ferrite. There is no coating around it.
2. OD = 35.3 mm; ID = 22.8 mm; H = 15.0 mm
3. Measured inductance for one winding (= AL): 2.7 μ H at frequencies between 50 kHz and 175 kHz; (with a few more windings you get the same result)
4. Calculation of the μ_i with the ring core calculator tool: approx. 2100
5. Ferrimagnetic resonance point: 2.15 MHz (From S11 measurement R + jX)
6. Value of the μ 's at the intersection point: approx. 1000 and you can further see the result in the graph.

Put the data of the core in the green fields. So the dimensions of the core, the number of windings used for the measurement, and the measured inductance from nanoSAVER in a not too high a frequency (say between 50 and 150 kHz).

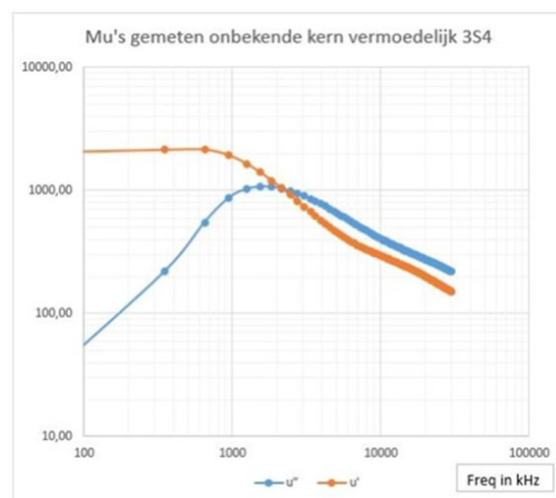
You can see the result in the image. The tool reports, among other things, AL and μ_i .

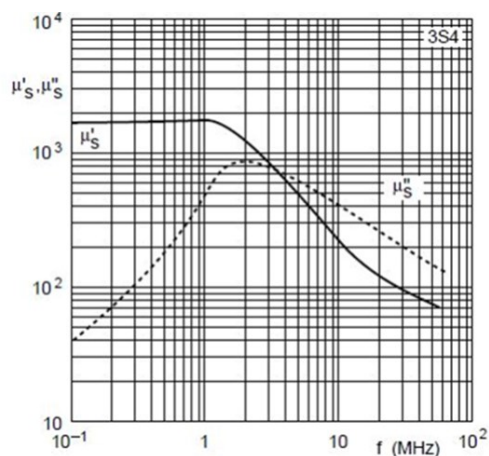
All in all, we neatly find the μ_i , albeit through multiple measurements, achievable, and providing sufficient insight.

Finding the ferrimagnetic point for this core makes no sense since the loss resistance R will for certain not come close to the reactance X for this type core material. You can see this for yourself by the S11 R + jX measurement. So we will leave it at this. The red color and a measured μ_i of 10 is sufficient evidence.

Core 2

This core is black and approximately 35mm in diameter. Type and material to be determined. We will go through the steps.





Then core material resembles: 3S4, which is officially registered with $\mu_i = 1700 \pm 20\%$. So, the measured 2100 is on the edge, because there are also other types with these measured values. The reason for choosing 3S4 is the result of the μ_s , which almost conforms to the Ferroxcube specification. On the left you see the Excel chart of the measurement, on the right the picture from Ferroxcube. But if someone can find another suitable picture, that is fine too. It does not always work because of the name, but because of the properties.

The calculation of the graph of the μ'_s is done as follows:

- Measure the core with one winding via S11, which is possible here with one winding because I got the same values for AL and μ_i with a different number of windings
- Export the measurement in an S1P file and open it in Excel
- Convert the S11 values to R and X in Excel. You will then receive the data S11 R + jX from nanoSAVER in table form (for formulas see page 56))
- Convert the R and X values to the two μ_s using AL and μ_i (formulas on page 56)
- Plot the μ'_s and μ''_s on a logarithmic scale graph

It was not easy to select a core material from the long line. You can find about 10 available from Fair Rite and ditto at Amidon. I did not count them from Ferroxcube. So ultimately, I opted for

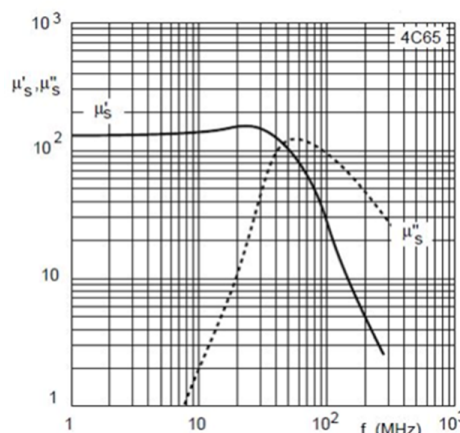
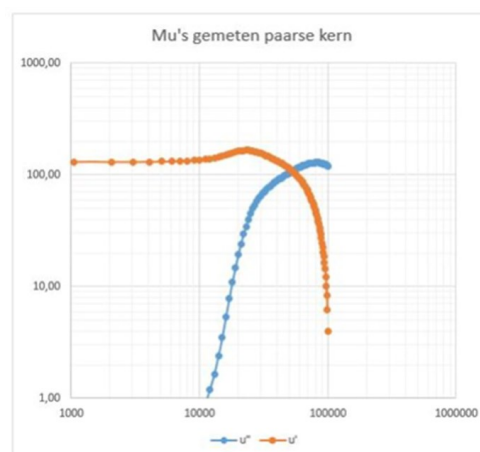
3S4 based on how the μ_s conforms. It is a matter of comparing many pictures and numbers.

Core 3

Returning to the beginning of this article, I chose as the third core one of the somewhat purple-colored cores of approx. 35mm, "presumably" of type 4C65.

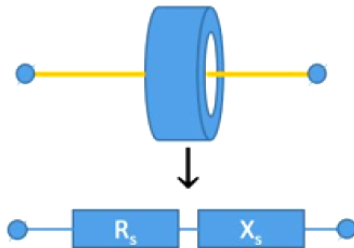
We will go through the same procedure as with the previous cores. With more and more windings (3 to 5) the measured μ_i quickly moves towards 125. That in itself is a good sign because that number is also in the specs. The problem of leaking flux also plays a role here. At the same time, you cannot use too many windings because to find the intersection of the μ_s you end up in the VHF area and then the parasitic capacity and the length of the winding wire do play a role.

The results of the measurement were as follows:



$$R_s = 50 \frac{1 - (S_i^2 + S_r^2)}{(1 - S_r)^2 + S_i^2}$$

$$X_s = \frac{100S_i}{(1 - S_r)^2 + S_i^2}$$



Left:

Formulas to calculate $S_{11} = S_r + jS_i$ to $R_s + X_s$

$$\mu'' = \frac{R_s * \mu_i}{2\pi f L}$$

Right:

Converting the measured R and X of the toroidal impedance to μ -value.

L = measured self-inductance values when determining μ_i . With one turn this is equal to AL .

$$\mu' = \frac{X_s * \mu_i}{2\pi f L}$$

The two graphs are remarkably similar. For my measurement, I stopped at 100 MHz. This is a bit high, given the simple measurement setup.

There is a way to measure it better with a single winding. To do this you should hang the core in a metal tube closed at both ends. Orient the middle of one winding facing one flat end and the other the opposite flat wall. The current then flows back to the inner wall of the tube all around the connection and then you have one completely covering winding. I'll gladly accept an offer from someone who can make such a thing for me, so I can give it a try :-). My details are on QRZ.com.

Conclusion

About measuring impedance values lower than 1 ohm. This is possible quite accurately with some careful effort and the nanoVNA and is similar to the way we had very high impedance values that we could measure in Part 2 of this series. How that works, and how it works out in practice, will be discussed in the next part (5) of this series.

73,

~ Arie Kleingeld PA3A

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References:

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<https://owenduffy.net/files/EstimateZFerriteToroidInductor.pdf>
2. Bob van Donselaar (ON9CVD): Ferrieten in HF-toepassingen Deel 1 (Electron september 2001)
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7. J.J. Carr: Toroïde spoelen zelf berekenen en maken (Elektuur 6-94)
8. Software: Mini Ring Core Calculator V1.3 van DL5SWB / DG0KW
<http://www.dl0hst.de/mini-ringkern-rechner.htm>



ARDF: Foxes & Bunnies

World Championship Report

Nick DF1FO

“Les VA7OM writes: “FYI, I had a conversation with Nick DF1FO about their foxhunts during COVID. BTW, Nick was born in Canada, has Canadian citizenship and represented Canada during several fox hunt world championships.”

This is what he emailed me”

We had a lot of ARDF activity since March, every weekend, or at least every second. We do it contact free - map and info by email, free start in a time window, self timing. It worked fine and the hunters are happy to have some outdoor activity. We even had a German Championship in September.

Finding course setters was not so easy here since Corona came along. In April/May we had a ‘lockdown’ - so people had little to do on the weekends, and touchless ARDF was legal all the time.

So surprisingly many hunters, up to 40, showed up for the first events when Brigitte and I set the courses. And, with a little encouragement, several of them were willing to set up courses themselves, including some first timers who discovered that course setting is fun too.

For 2m we mostly use my 100 mW transmitter with integrated halo antenna. They are lighter and easier to set up than the 1W/crossed dipole version, and the signal is strong enough.

For 80m we use my 1W design. Setting up 80m is more work (installing the antenna and ground, tuning TX) and more stuff to carry than 2m. So 80m courses are set up mostly by the experienced course setters.

Since the hunters had little chance to chat with others on their experience during the hunt, we encouraged them to write a little report. The course setter collected these reports and send them back 3 days after the event.

We added photos made by the course setter, participants or a wildlife camera. These reports became very popular, even by the non-participants, and we still do them.

The full (translated) file may be viewed [here](#).

Saturday, May 8, 2021 is the tentative date for the next SARC annual foxhunt.





VE7SL's Radio Notebook

New Hope For Cycle 25!

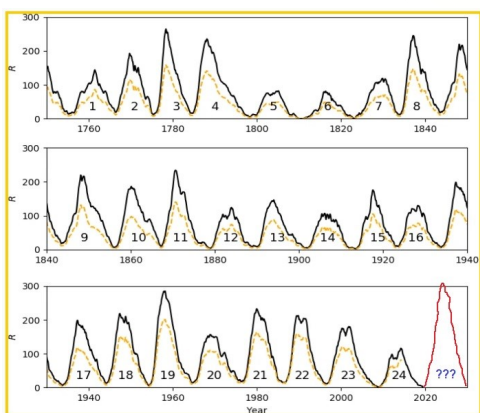
Steve McDonald VE7SL

Unlike most forecasts for solar Cycle 25, a recently released paper from five solar scientists¹ has given many 6m diehards new reasons to hope!

After countless dire predictions for the upcoming cycle indicating similar or even poorer activity levels than the disappointing Cycle 24, the new paper suggests just the opposite!

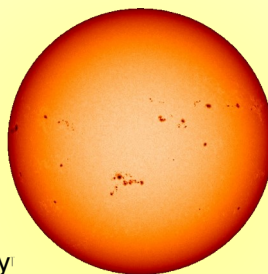
In fact, the group of scientists predict that *"Cycle 25 will probably be among the strongest solar cycles ever observed, and that it will almost certainly be stronger than present SC24 (116 spots) and most likely stronger than the previous cycle 23 (180 spots)."*

Will Cycle 25 replace Cycle 19 as #1? Image with my addition in RED.



Solar Cycle 19 was a monster, reaching a SSN level of 285... to imagine the possibility of something even stronger is truly exciting. The just-ending Cycle 24 was one of the weakest on record, reaching an SSN of just 116.

During Cycle 24, maximum usable frequencies (MUF) for F2 propagation often



struggled just to reach 28MHz, and except for the peak year, the worldwide propagation conditions that amateurs had come to expect were often absent.

Should these new optimistic predictions come to pass, 6m operators can look forward to some truly, never-before-seen, fall and winter propagation... for at least three or more winters.

With SSN values reaching the high two-hundreds or beyond, west coast operators can expect to see the 6m band often open before sunrise, most likely favoring Europe via the polar path or towards Africa via the trans-Atlantic path. Unlike 20m, there will be little to no 'polar flutter' and since signals propagating near the F2 MUF suffer very little path loss, they will probably be very strong.

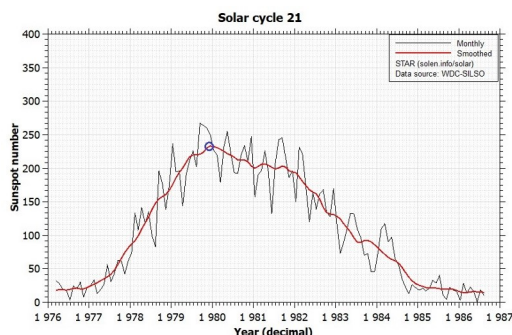
Later in the day, propagation will shift south towards Central and South America before moving to the west. Depending on the time of year, the propagation will favor Asia, with signals from Japan, China and other far-eastern exotica in the early fall through the New Year. As well, the band will often stay open for some time after local sunset. Late winter and spring will see the western path favour signals from down under, and stretch out to the southern far east regions towards the Indian Ocean. These were the

propagation patterns noted from here during Cycles 21-23, when SSNs reached 233, 214 and 180 respectively.

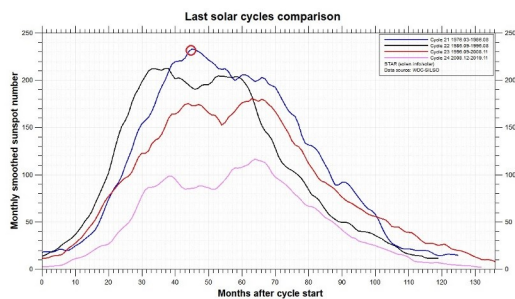
With much gratitude to Mark (VA7MM) for converting my old analog tapes to mp3, here is a recording I made on the morning of November 7, 1979, at the height of Cycle 21. It will give you a taste of what could be in store. On that Wednesday morning, the band opened around 0800 and continued through to sunset, closing with a three-hour opening to the Pacific and Japan. Like many other 6m operators, I had taken the day off work with a case of the 'F2 flu' that was very prevalent that winter! The recording begins with a short exchange between VE1ASJ and VE1AVX, while trying to work a very 'rare' (for them) KL7...

[F2 from Cycle 21](#)

The graph of Cycle 21 shows when the recording was made. Although not known at the time, it was very close to the peak of the cycle.



courtesy: <http://www.solen.info/solar/>



courtesy: <http://www.solen.info/solar/>

A record-busting Cycle 25 will be like these previous cycles only on steroids! With such a cycle, 10m will follow a similar pattern but will likely be open 24/7 as I recall listening to VKs and ZLs on 10m AM well after midnight during the downward climb of Cycle 19... and this was on a very '10m-deaf' Hallicrafters S-38 and a short wire out the attic window!

For those wanting to read the fascinating paper: "Overlapping Magnetic Activity Cycles and the Sunspot Number: Forecasting Sunspot Cycle 25 Amplitude", you can [find a pdf here](#). As well, you can read the ARRL's own announcement of this exciting possibility [here](#).

One certainty is, that if FT8 is still around by then, it and your soundcard will fold up quickly once the band opens with wall-to-wall S9++ signals. It may be useful during the first early minutes or during marginal openings, but knowing the signal levels that 6m F2 can produce, it will be like trying to use FT8 with dozens of new neighbors operating on your own block ... and you can easily guess how well that might work! As we've come to understand, FT8 is a wonderful weak-signal mode, but throw just one bone-crushing signal into the waterfall and it's game-over... on F2, there will be dozens of these!

Such stellar conditions on 6m are ideally suited to CW or SSB and I think there will be a fast exodus from FT8 back to the traditional modes very early... those that aren't prepared for this, relying only on FT8, will most likely be in for a rude awakening. If you're a 6m "no-coder", now's the time to hunker-down and learn CW... by the time Cycle 25 becomes productive, you won't be left out of the many CW DX opportunities that will surely be available on this much quicker QSO mode.

We will no doubt be reading more about this as Cycle 25 begins to grow. As in almost all stronger than normal cycles, growth from the start to the peak is much shorter than normal so I'll be watching for a fast

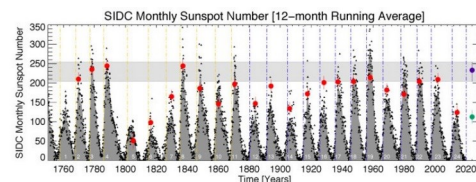


Figure 4. Cycle 25 amplitude forecast in context. The monthly mean number of sunspots since 1749. The data values are represented by dots and the 12-month running average values are illustrated as a dark gray shaded area. The sunspot cycle numbers are shown in the shaded area—SC1 starting in the 1755 and SC24 presently drawing to a close. For comparison with Fig. 1 we show the (M2019) vertical blue dashed lines that signify the magnetic activity cycle termination times that trigger the rapid growth of sunspot activity, while the vertical orange dashed lines show the discrete Hilbert transform derived terminators of Leamon et al.¹⁵, see Fig. 2 and Tab. 1. Also shown are the forecast values of SC25 amplitude from the analysis above (purple dot) and the SC25PP (green dot). The horizontal light-gray shaded region is to place the present forecast in historical context. Finally, we show the hindcast sunspot maximum values for each cycle (red dots) derived from the measured terminator values and using the relationship developed above - the error bars on the hindcast dots represent the 68% confidence value.

rise in sunspot numbers once we are really underway.

Hindcast modelling (backtesting) of the data derived from previous cycles going back to the 1700s using the paper's prediction methodology, shows an accurate alignment with what actually occurred. The red dots in the graph above indicate the model's predicted peak superimposed on the actual peak. In some cases, the peaks were even higher than the modelling suggested.

The predictions identify the so-called "termination" events, landmarks marking the start and end of sunspot and magnetic activity cycles, extracting a relationship between the temporal spacing of terminators and the magnitude of sunspot cycles. The success of these predictions will depend upon an upcoming terminator event before the end of 2020. Should it occur on time, the predictions will be given a much greater chance of coming to fruition... *"with a terminator event in 2020, we deduce that sunspot cycle 25 will have a magnitude that rivals the top few since records began. This outcome would be in stark contrast to the community consensus estimate of sunspot cycle 25 magnitude."*

More interesting discussions of the paper can be found [here](#) and [here](#).

July's high-latitude Cycle 25 sunspots are a great sign. When the terminator event occurs, solar activity will ramp-up very quickly, within one 27 day solar rotation. Let's hope we're getting close.

As noted in the paper, "Very early indications of the spot pattern are appearing at higher than

average latitudes. Historically, high latitude spot emergence has been associated with the development of large amplitude sunspot cycles – only time will tell."

Hopefully we'll all need to hold on to our hats... it might just be the ride of our lives!

¹ Scott W. McIntosh, Sandra C. Chapman, Robert J. Leamon, Ricky Egeland, and Nicholas W. Watkins

1. National Center for Atmospheric Research, P.O. Box 3000, Boulder, CO 80307, USA.
2. Centre for Fusion, Space and Astrophysics, University of Warwick, Coventry CV4 7AL, UK
3. University of Maryland, Department of Astronomy, College Park, MD 20742, USA.
4. NASA Goddard Space Flight Center, Code 672, Greenbelt, MD 20771, USA.
5. Centre for the Analysis of Time Series, London School of Economics and Political Science, London WC2A 2AZ, UK
6. School of Engineering and Innovation, STEM Faculty, The Open University, Milton Keynes, UK

~ 73 Steve VE7SL

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and Steve's blog at"

[VE7SL - Steve - Amateur Radio Blog](http://VE7SL-Steve-AmateurRadioBlog)



OTTAWA, ON - The Royal Canadian Mint is proud to launch a \$2 circulation coin celebrating the 75th anniversary of the end of the Second World War and the Canadians who defeated enemies of freedom after six long years of service on the battlefield and on the home front. Symbolic of that heroic accomplishment, a "V" for Victory figures prominently on this new commemorative coin.

The words VICTORY and VICTOIRE appear on the outer ring, as does a message engraved in Morse code. "We win when we work willingly".



Metro Vancouver Radio Nets

Get on the air!

Please support local Amateur Radio nets. All frequencies are FM unless otherwise noted. All times listed are local unless noted otherwise (Z is UTC). Most repeaters support Echolink or IRLP. Non-local check-ins always welcome.

Day	Time	Name	Callsign	Specification
Mon-Sat	08:45	Breakfast Bunch Net	VE7SYD	442.275 +5.000 MHz, T136.5 Hz
Daily	09:00	Rainbow Country Net	VE7RPT	146.940 -0.600 MHz, T136.5 Hz
Daily	01:30Z	BC Public Service Net	SSB 80m	3.729 MHz
Daily	19:05	VECTOR Informal Net	VE7RVF	145.450 -0.600 MHz, T100.0 Hz Weekly
Monday	19:30	Coquitlam ARESS Net	VE7MFS	145.310 -0.600 MHz, T127.3 Hz
Monday	19:30	Langley Amateur Radio	VE7RLY	147.380 +0.600 MHz, T110.9
Monday	20:00	Burnaby ARC	VE7RBY	145.350 -0.600 MHz, T127.3 Hz
Tuesday	19:00	North Shore Club Net	VE7RNV	147.260 +0.600 MHz
Tuesday	19:00	Richmond ARC Net	VE7RMD	147.140 +0.600 MHz, T79.7 Hz
Tuesday	19:30	New Westminster ARC	VE7NWR	145.390 -0.600 MHz, T100.0 Hz
Tuesday	19:30	Surrey Emerg Pgm AR	VE7RSC	147.360 +0.600 MHz, T110.9
Tuesday	20:00	Pacific NW	2m SSB	144.240 MHz USB
Tuesday	20:00	Surrey ARC	VE7RSC	147.360 +0.600 MHz, T110.9
Wednesday	08:00	IRLP Trans-Canada	VE7RHS	145.270 -0.600 MHz, T100.0 Hz
Wednesday	18:30	VECTOR Pre-net Chat	VE7RVZ	147.200 +0.600 MHz, T100.0 Hz (only 10 W output)
Wednesday	19:00	Salt Spring Net	VE7RSI	147.320 +0.600 MHz, T88.5 Hz
Wednesday	19:00	Vancouver Island Net	VE7RAH	145.430 MHz, T100.0 Hz
Wednesday	19:30	Richmond EP Net	VA7RER	440.900 +5.000 MHz, T79.7 Hz
Wednesday	20:00	VECTOR Weekly Net	VE7TEL	145.170 -0.600 MHz
Thursday	19:00	Chinatown 2m SSB Net	VE7OR	144.255 MHz USB
Thursday	20:00	Burnaby Tech Net	VE7RBY	145.350 -0.600 MHz
Thursday	20:30	Delta ARS	VE7SUN	147.340 +0.600 MHz, T107.2 Hz
Saturday	10:30	Richmond Coffee Net	VE7RMD	147.140 +0.600 MHz, T79.7 Hz
Saturday	23:00	Sea to Sky Net	HF 80m	3.735 MHz
Sunday	08:00	Pacific Northwest Net	SSB 2m	144.240 MHz USB
Sunday	10:00	Trans-Canada Net		AllStar 51730 IRLP 9029 Echolink 590387
Sunday	19:30	CW Listening VE7MHD	VE7RBY	145.350 -0.600 MHz, T127.3 Hz

Please report any additions, changes or errors to webmaster@vectorradio.ca

~ Courtesy VECTOR

Automatic Dependent Surveillance-Broadcast

John Schouten VE7TI

Alternative Antennas



Last issue I wrote about my foray into the world of ADS-B. Having several weeks of use now I thought I would experiment with some alternate antennas. I've always loved building my own antennas and it is much less expensive than purchasing them off the shelf. The fact that ADS-B is receive only makes it even simpler as receiving antennas are more forgiving than those that also have to transmit.

At the ADS-B frequency, 1090 MHz, antennas are very small compared to say 2m. And, remembering antenna class... to find the wavelength (λ) divide the speed of light by the frequency (in MHz), and $300,000,000/1,090,000,000$ equals 0.275229 or 275mm. Therefore, a 1/4 wavelength is only 68mm (2.68"). Accuracy of measurement is important because even a 5% error is about 3.5mm. The big plus is that it takes very little material to make an antenna at this frequency.

REQUIREMENTS	
Freq. [MHz]	1090
Boomlength [m]	0.201
Gain [dBd] (approx.)	7.99
Elements	5
Diameter of parasitic Elements [mm]	3
Diameter of Boom [mm]	20
Is the boom isolated from parasitics ?	☐ yes ☒ no
SHOW ME THE DETAILS	

DESIGN DATA FOR YOUR YAGI	
Gain	: 7.99 dBd (approx.)
Reflector Length	: 142 mm
Reflector Position	: 0 mm
Dipole Position	: 66 mm
Director #1 Position	: 87 mm, Length : 135 mm
Distance Dir. #1 - Dir. #2	: 50 mm
Director #2 Position	: 136 mm, Length : 134 mm
Distance Dir. #2 - Dir. #3	: 59 mm
Director #3 Position	: 195 mm, Length : 132 mm
Distance Dir. #3 - Dir. #4	: 59 mm
Directors / Parasitics are not isolated.	
The length has been increased to compensate for that.	



The 1090 Yagi

I could find no plans on the Internet for a yagi at this frequency, so I turned to a favourite site for antenna design <https://www.changpuak.ch/electronics/>. This site is a one-stop shop for more than just antenna design, including Arduino, Pi, and other circuits. Under antennas you will find calculators for at least 17 different types of antennas. You start by entering the frequency you wish to tune, in this case 1090 MHz. Enter the number of elements. I was looking for gain so I chose 5 elements for almost 8 db gain (about 2.5 times voltage increase). I use brass welding rod for my elements so I entered 3mm for the diameter of the parasitic elements. The tubing for the boom that I had in my scrapbox was 20mm diameter. I wanted simplicity and planned to drill through the boom for the elements so I selected “no” for “Is the boom isolated from the parasitics”. If you isolate the elements they will be a bit shorter. My boom needed to be 201mm long.

I clicked on “Show me the details” and the specs for my antenna were listed. Refer to the photo on the previous page, 0mm refers to the start of all measurements which are taken from the back of the yagi.

1. The reflector at 0mm and 142mm long;
2. The half-wave driven element at 66mm and 137.5mm long;
3. Director #1 at 87mm and 135mm long;
4. Director #2 at 136mm and 134mm long;
5. Director #3 at 195mm and 132mm long.

I carefully marked the positions of the elements on the boom tube, centre punched these points and drilled 3mm holes through at each location. Again, accuracy here is the key to a properly tuned antenna.



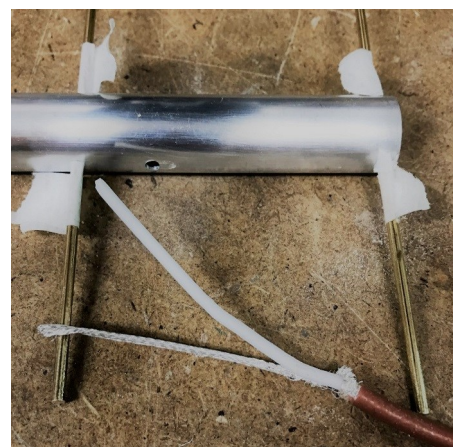
I inserted the parasitic elements and used some masking tape to keep

them exactly centered on the boom. Then I used 5-minute epoxy to glue each element in place. Because we had selected to not isolate the parasitic elements, it does not matter if they contact the boom. The next step was the driven element. To minimize losses I used good quality, low-loss RG-142 double-shielded coax of which I had several short lengths. The RG142 cable was specifically built for the United States Military in the World War II era. It has a military equivalent part number of M17/60-RG142. The United States Military uses this ‘highly reliable’ RG142 in their satellites, systems, and other tactical operations and equipment.

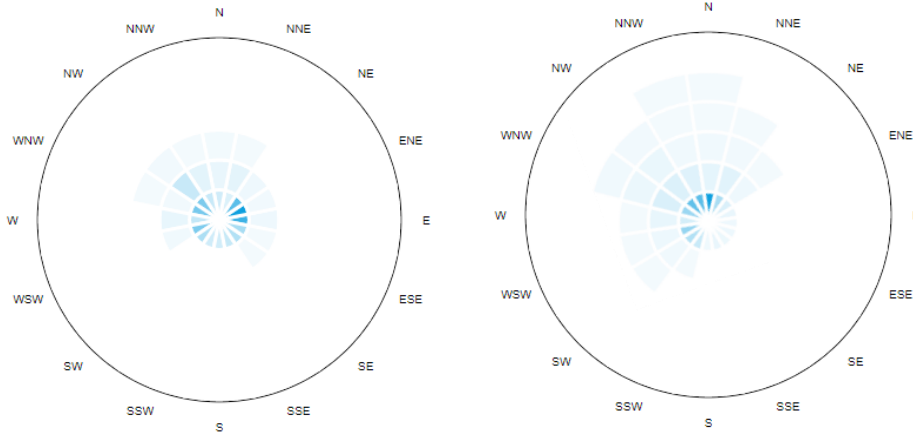


It is probably the best coax I have ever used, good to 1900 Volts, 1100 Watts and 8000 MHz. It is thin, quite flexible and very tolerant of heat when soldering. The inner conductor is silver plated copper-clad steel and the 2 outer conductors silver plated copper—a breeze to solder.

I separated the braid from the center conductor, and covered each with some heat shrink tubing. It was thin enough to fish out and thread each side through slightly larger holes. I soldered the elements on to the coax and epoxied them in place. It took only a few minutes for the epoxy to harden so I was able to prepare the end of the cable for a BNC connector.

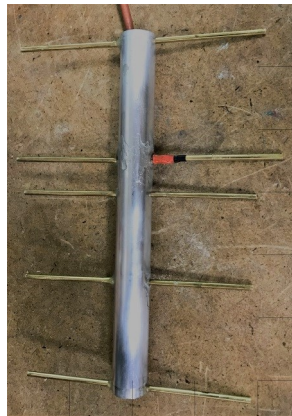
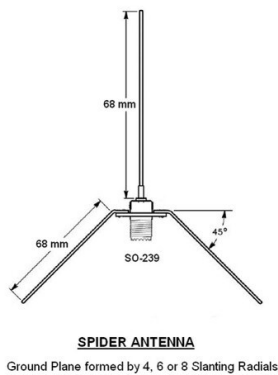


It was ready for a test. I had the best success to date with a plain quarter-wave vertical with radials bent down at 45 degrees. It is omni-



The tale of two antennas: Left is the 1/4 wave omni vertical ‘spider’ antenna, and right the yagi.

Below the plots are the two antennas responsible for them.



directional but the elevation contours in my neighbourhood significantly reduced signal from several area, including YVR—Vancouver International Airport. I thought a yagi might overcome this given the higher gain and I was prepared to give up coverage on the ‘good’ side where I have received ADS-B signals from as far as 150 miles. Even a yagi will pick up signals from the sides and back.

Mounted on a 4 foot mast on my roof about 10m (30 feet above ground) I checked on the results. Wherever I pointed the yagi the signal was clearly better give the number of aircraft being received. If you use SkyAware for your tracking, they provide comprehensive statistics. As shown in

the plots [left] you can see the additional directivity the yagi provides but at the expense of few aircraft southeast.

Each circle indicates 50 miles, so the farthest with the ‘spider’ is 150mi, while the yagi is 250 mi. The colour saturation indicates the number of ‘pings’ received.

The only anomaly here is that this comparison happened over the space of a couple of days. I have found that air traffic not only varies throughout the day but also the day of the week, so while the aircraft count may not be comparable for the two antennas, the directivity is a certainty.

What antenna to try next? Perhaps a ‘can-tenna’ for even more directivity. Stay tuned.

~ John VE7TI



Consider a 4 foot Diameter WWII Searchlight
Converted to a 500 GHz Reflector Antenna

$$D = 4 \text{ ft} = 1.2192 \text{ m} = 1,219.2 \text{ mm}$$

$$\text{Physical Area} = 1.167 \text{ m}^2$$

$$\lambda_{500\text{GHz}} = 0.6 \text{ mm} = 0.0006 \text{ m}$$

$$D = 2032 \lambda_{500\text{GHz}}$$

Effective Area (Assuming 72.72% Overall Efficiency)

$$A_e = 0.725 \text{ m}^2, A_p = 0.846 \text{ m}^2$$

$$\text{Gain} = 2,953,0971 = 74.7 \text{ dB}_i$$

$$\text{Far-field Distance} = R_F = 2D^2/\lambda = 4955 \text{ m} = 3.1 \text{ miles}$$

$$\text{Beamwidths (Assuming } BW_{AZ} = BW_{EL}) = 0.03187 \text{ Degrees}$$

(It took about one week to find the main beam using the Georgia Tech Far-field antenna range.)

Ed Joy, KOJOY

Virtually Smashing Ham Radio Equipment

Daniel Romila VE7LCG

One of the main activities of radio amateur life is the smashing of ham radio equipment. This can be done in various settings, alone or in group. It is one of the most satisfying activities, which makes many people come into our hobby.

In a not so distant past, this activity usually happened at ham radio swaps. Somebody asked another ham from a neighboring sale booth:

- I am going out several minutes. Can you please watch my things?
- Sure.

Once the guy was gone, the other guy took out a hammer, and 'fixed' all the competitor's equipment. Unfortunately COVID 19 changed this aspect of ham radio activity as well. The smashing of ham radio equipment went much more virtual than before.

But one should remember here that it is still a smashing, a full force activity, which



requires tools. We should start with the history of such tools. As you see from the picture [left].

The caveman was well prepared to be a ham radio operator, since he had the tool, the will, and the anger for ham radio equipment smashing. We still cannot understand how such ready hominids did not

become ham radio operators. A very unfortunate difference in time between the well prepared psychology of individuals and the technical development of society.



Anyhow, in the most recent times, we always suspected Salvador Dali was a licensed ham radio operator, although no evidence has been found yet.

Look for yourself at the melting watches he painted, like a pretty well smashed piece of equipment ⇒

If the picture still does not convince you of the theory that maybe Dali was a ham radio operator in disguise, you should look carefully at his painting "The Persistence of Memory". He is not only smashing things, he remembers it for a long while with satisfaction, as the title already tells us ⇒

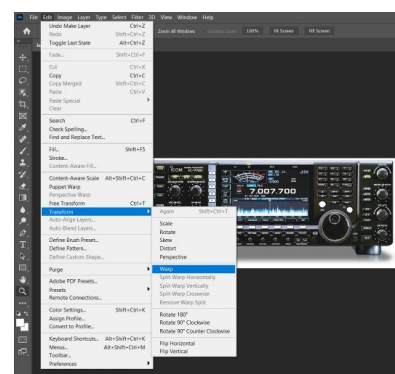
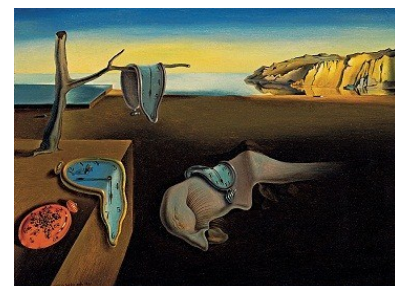
Coming back to our virtual smashing procedure, we cannot expect everybody to be able to paint. So you should take a picture of your equipment, and use image editing software. For example, one can warp an ICOM transceiver in Adobe Photoshop ⇒

The result is a much better ICOM, after the application of the virtual smashing (warping). But if this is not fulfilling you enough, you should apply the liquefy filter ⇒

Other satisfying versions ⇒

As a conclusion, never forget to manifest and implement smashing of ham radio equipment, either physically or virtually - now that we are in COVID-19 times. It defines who we are, where we are coming from, and in which direction we are going.

~ Daniel VE7LCG



Ham Leftovers...

The military renaissance in high frequency communications -Andrew White

LONDON — Special operations commands across Europe are ramping up their capabilities with HF communications to ensure connectivity on the battlefield as a way to optimize properties that provide a low probability of interception and detection. See: <https://www.c4isrnet.com/battlefield-tech/it-networks/2020/09/22/the-military-renaissance-in-high-frequency-communications/> for the full story.

This is a very easy to use site for generating **coverage maps**. Click on the link for the report. Anything not red is obstructed.

Take a look at <http://www.heywhatsthat.com/>

Big sunspot alert

There's a new sunspot on the sun - and it's a big one.

AR2778 contains a dozen dark cores sprawling nearly 100,000 km across the solar surface. Earlier today, it began to strobe Earth with minor C-class solar flares, activity which could intensify if the sunspot's rapid growth continues apace.

Visit Spaceweather.com for updates and more information, and don't forget The Space Weatherwoman, Dr. Tamitha Skov. She provides weekly forecasts of solar and other news of interest to Amateur Radio. See <https://youtu.be/OqpqVbkwiGA>

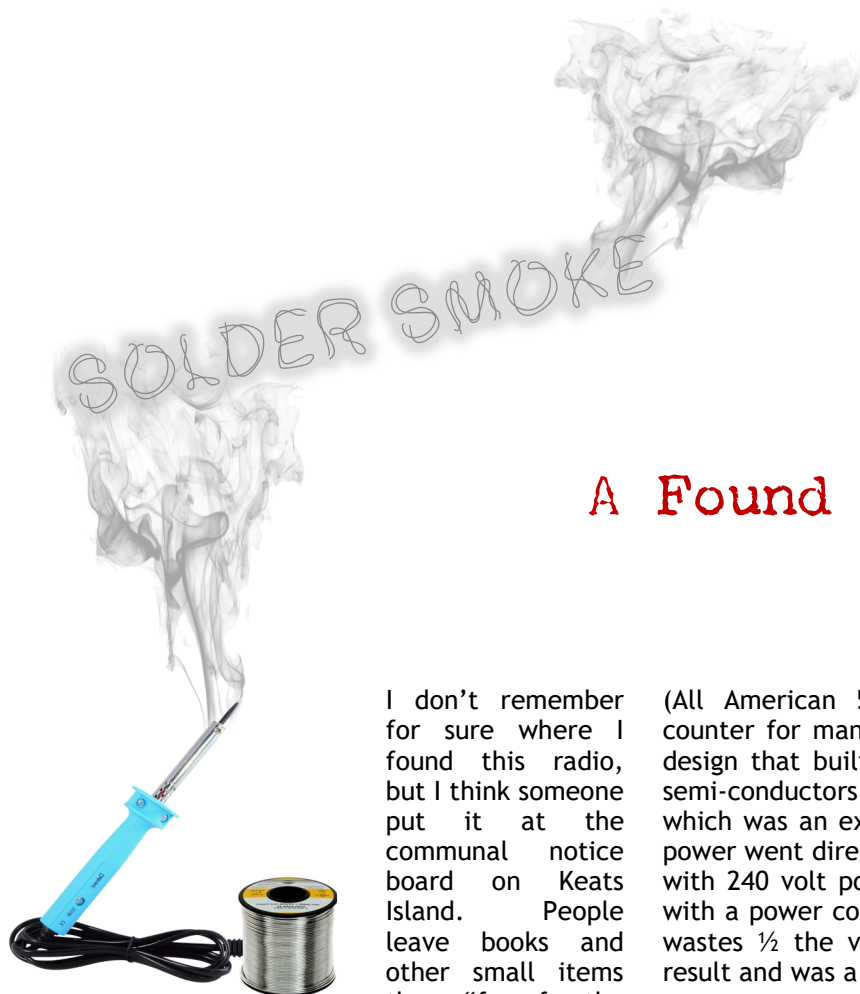
We've heard of fox hunting, but this is serious!

You have probably seen the story in the news of a murder hornet's nest having been found in Blaine, WA and thankfully destroyed. The battery-powered transmitter sends out "chirps" on a radio frequency that are picked up by a handheld receiver tuned to that frequency. They are then tracked by direction finding. But the background may inspire those of us who think of ways to make radios small and lightweight.

This [link](#) shows what a hornet tracker looks like. More [here](#).

10 ways the ICOM 7300 has impacted ham radio

Veteran hams review the impact of the IC-7300 on ham radio 5 years after it was introduced. <https://youtu.be/U5QBAILUGFM>



Ian Simpson VE7IS

A Found Transistor Radio

I don't remember for sure where I found this radio, but I think someone put it at the communal notice board on Keats Island. People leave books and other small items there "free for the taking".

Larger stuff is sometimes left on the edge of the road. The radio is shown in Figure 1. It is AM only. It receives CBC AM on 690 very well. It is about 5 inches wide and 3 inches high. Hitachi Model TH-848 made in Japan.

I love these old electronic objects that were a pre-cursor to where we are now with incredible mobile phones, fibre-optic Internet, Netflix etc. I wondered if it worked. The www.radiomuseum.org site has a lot of information about this and other vintage radios. This one was made in 1963 to 1965. Accessories included leather case, shoulder strap, earphone & outside antenna wire. A note says it was sold for £27/6 in Australia. I was in the UK around this time and that is more than half a monthly salary for many people at that time. It was the early days of semi-conductors replacing tubes or valves in radios.

A tube radio could be made with 5 tubes. One day I will put together an essay about the AA5 radios

(All American 5) that were on every kitchen counter for many years. They were an optimized design that built a table radio using 5 tubes (no semi-conductors) and usually had no transformer, which was an expensive part. The 120 volt mains power went directly into the circuitry. In countries with 240 volt power, they were sometimes made with a power cord with resistance that essentially wastes $\frac{1}{2}$ the voltage. The cord got warm as a result and was a fire hazard.

Back to the transistor radio. Makers liked to tell you how many transistors were used as they were the expensive parts. This one has 8, which is about the minimum count for an effective radio receiver.

When I connected a 9 volt battery to the radio, there was only a small click. It was dead. I decided I would try to fix it. I was intrigued as well, because this was the early era of commercial transistors and these radios all had Germanium PNP transistors in them. Think of PNP as positive-negative-positive material in the transistor. As time went on silicon transistors became available and were much preferred because they were more robust and eventually could handle higher frequencies and much more power. Initially

Figure 1 The Radio After Repair





Figure 2 The radio now works with an OC81 transistor temporarily attached. The faulty one is at the bottom of the picture.

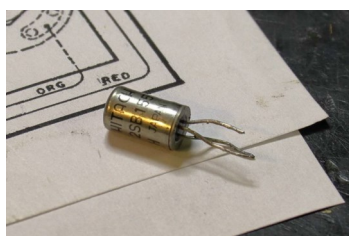


Figure 3 The Blown 2SB155



Figure 4 The Mullard OC81 Properly Soldered in. It is the Can with a Red Dot

they were mostly NPN (negative-positive-negative material), but both types are used.

I thought I would be able to fix the radio by simply tracing through it to find what part or parts had failed. I knew the early transistors were quite delicate and easily damaged by excessive current flow. Possibly the previous owner had been connecting a new 9 volt battery while the radio was turned on and accidentally touch the terminals backwards, which could maybe blow one or more transistors. I am not sure if this really was what killed it.

I was able to download a page from www.radiomuseum.org that amazingly has the full circuit diagram in schematic format as well as the parts and printed circuit layout. You can see parts of the diagrams in some of my photos.

I was able to work back from the loud speaker checking the circuitry and transistors 8, 7 and 6 and soon found transistor 5 did not seem to function properly. Its type is 2SB155, which is a Japanese series of transistors. I have in my junk some very old Germanium transistors made by Mullard in the UK with names like OC44, OC71 and OC81.

The Mullard OC81 should work as a substitute for the 2SB155. Technically, the connection is as an emitter follower. I soldered it in temporarily as in Figure 2. The OC81 transistor is the object like a small aluminum can with three wires between the printed circuit board and the 9 volt battery.

Figure 3 shows the blown transistor. I was able to test that it did not work. Figure 4 shows the OC81 properly soldered in place and a bit taller than the other components, however, the back cover of the radio still closed.

Looking at this little radio, I am amazed. It was made about 55 years ago and probably never repaired before. Only one component has failed. The circuitry is what is called a superheterodyne or superhet for short, that was used in most radios for many decades, even in modern radios. The superhet converts the received frequency to a fixed frequency that is amplified by a narrowly tuned amplifier resulting in good selectivity. Only the wanted station is heard. I am sure it was built by hand with every part inserted manually. There are no integrated circuits, only 8 transistors or semi-conductors. Computer chips have millions of transistors in them.

~ Ian VE7IS

I am the editor for the [SKCC 'Rag Chew' newsletter](http://www.skcc.org). I read with great interest your article in the September/October issue of TCA [and the July-Aug Communicator -Ed.], "Socially Distanced Team Contesting with N1MM+ Via VPN" and it is excellent! I think many of our 23,000+ members would enjoy reading this and learning how to develop this system for fun and safety during these troubled times. I followed your procedure here in my own shack (K8AQM) and it worked great.

73, Ted K8AQM/VE9AQM





RAC Update:

Annual General Meeting Presentations now on-line

Radio Amateurs of Canada would like to thank all of the presenters, participants and volunteers for organizing and attending the [RAC Canada 2020 Conference and Annual General Meeting](#).

All presentations are now available for viewing on the new [RAC YouTube Channel](#).

Please note that the videos are currently in raw format and we hope to edit them at some time in the future when time permits. A detailed description of all of the presentations can be found on the RAC website at:

<https://www.rac.ca/canada-2020-conference-agm-videos/>

Keynote presentation:

“A Fireside Chat: Amateur Radio during the Global Pandemic and other topics”

In these unprecedented times, this was an excellent and possibly historic opportunity to engage in a discussion on the challenges we face today and on the future of Amateur Radio. Thank you for taking the time to join us!

Main presentations in the order they appeared:

Special thanks to all the following presenters for rising to the challenge and creating great presentations under very tight timelines while learning new technology at the same time. We realize that this was by no means an easy task and we thank you for your significant contribution!

- **Getting Started with Amateur Radio Satellites**
Tom Schuessler, N5HYP
- **Amateur Radio and Youth**
Brian Jackson, VE6JB

- **Amateur Radio Challenges in Canada’s North**
Ron Thompson, VE8RT and Angela Gerbrandt, VY0YL
- **CY9C St. Paul Island DXpedition**
Phil McBride, VA3QR/VA3KPJ
- **6m FT8 DXing**
Ron Schwartz, VE3VN
- **Contesting: Remote Operating**
Gary Rubinfeld, VE4EA, Tom Haavisto, VE3CX and Gerry Hull, VE1RM;
- **VO2AC: Contest DXpedition to Labrador (CQ Zone 2)**
Chris Allingham, VE3FU/VO2AC
- **Amateur Radio Hotspots: A Quick Overview**
Allan Boyd, VE3AJB
- **Amateur Radio: Yesterday, Today and Tomorrow**
Allen Wootton, VY1KX
- **High Altitude Balloons: The Elevation Education**
Kelly Shulman, VE3KLX

RAC Annual General Meeting

The RAC Annual General Meeting can be found at the 4:03 minute mark of the following video. We are still learning the fine art of Zoom so please bear with us.
<https://www.youtube.com/watch?v=8NZ0fTUL0ng&t=2072s>

Thank you again!
Alan Griffin, RAC MarCom Director/TCA Editor
marcom@rac.ca

KB6NU's Column

Dan Romanchik, KB6NU

Are Blogs the New Ham Radio?



In a recent post to his blog, Steven Streight, aka Vaspers the Grate, takes on Lev Grossman, who in the December 31, 2004 issue of Time compared blogging to amateur radio. In that issue, Grossman said, “Before this year [2004], blogs were a curiosity, a cult phenomenon, a faintly embarrassing hobby on the order of ham radio and stamp collecting.”

Grossman’s impression seems to be that hams do nothing more than talk about ham radio (which is, of course, ridiculous) while bloggers spend an inordinate amount of time blogging just to blog. They’re filling many Mbytes of disk space with nothing more than jabbering.

Steven, who’s not an amateur radio operator, went some pains to set the record straight (pun intended). He actually did a little research—unlike our friend Grossman—and came away with a much more favorable view of amateur radio. He writes:

“My opinion is that blogging, ham radio operating, and stamp collecting involve some degree of thinking and human communication, and in the case of stamp collecting, artistic sensibility and foreign culture appreciation.”

I’d also add that amateur radio operators also come to appreciate foreign culture, perhaps even more so than stamp collectors. Ham radio is, after all, an international brotherhood (and sisterhood), and many of us form friendships with hams in countries outside our own.

So is blogging the new ham radio? In some respects, it is. They’re both communications media for one, and to be honest, both have idle jabberers. But beyond the jabbering, both serve a useful purpose. The amateur radio service helps supply the need for technically competent individuals who stand ready to serve in emergencies. Blogging also helps us to communicate by allowing us to get around the mainstream media, which is increasingly under the control of fewer and fewer corporations. But just as you need a receiver capable of filtering out the signal from the noise to successfully use amateur radio, so too must you be able to filter out the noise in the blogosphere to receive the useful signals.

Streight concludes by saying some nice things about this blog. I won’t quote them here—I’ll let you read them for yourself. He also plans to include my blog in his next book, *Secrets of the Blogging Pros*.

~ Dan KB6NU

When he's not trying to figure out which way current flows, Dan blogs about amateur radio at KB6NU.com, teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com.

The Reverse Beacon Network

The Reverse Beacon Network or RBN is a service that is invaluable to CW operators. It is made up of dozens of dedicated receiving stations who report on all signals heard, both signal strength and CW speed. It is especially useful as a propagation tool. Just call CQ and see where and how well you are being heard.

Use it to compare antenna performance or to see how you are doing compared to other stations. Probably the most useful feature is a database of past spots so you can look back over time to see what was happening on the bands.

The RBN is hosted by DXwatch.com and to use the system, you just log into reversebeacon.net



~ IRTS

2nd Generation Foxhunt Receivers Now Available

Just in time for the fall foxhunt season, second generation foxhunt receivers by Les Tocko VA7OM and Dave Miller VE7HR are now complete, with the production run tested, tuned up and available for sale.

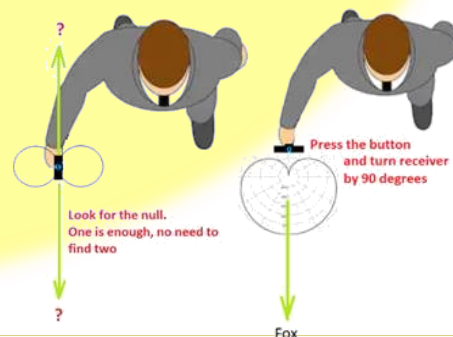
My involvement has been in the administration and final assembly but otherwise all the credit for this technical achievement goes to Les and Dave. Having seen every unit up close, I can assure you that RX80M, as it is called, is of an exceptional professional quality. Full details on the cost, specifications, instructional video and ordering information can be found at www.RX80M.com.

Only 100 of these units are available. Although priority is being given to local orders, it will be "first come, first served" so if you want one, don't delay ordering.

80m transmitters (foxes) will be available soon.



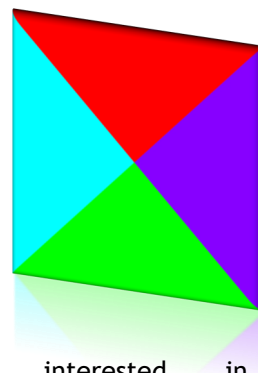
~ John VA7XB



Foundations Of Amateur Radio

Onno Benschop VK6FLAB

An ionospheric monitoring service at home



Podcast

*To listen to the podcast, visit the website:
<http://podcasts.vk6flab.com/>. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.*

*Full instructions on how to listen are here:
<https://podcasts.vk6flab.com/about/help>*

One of the more fundamental aspects of long distance radio communication is the impact of the ionosphere. Depending on how excited the Sun is, what time of day it is and what frequency you're using at the time will determine if the signal you're trying to hear from the other side of the planet makes it to you or is on its way to a radio amateur on Proxima B who is likely to hear this podcast in just over 4 years from now.

In other words, the ionosphere can act like a mirror to radio waves, or it can be all but invisible.

As luck would have it, this changes all the time. Much like waiting for the local weather bureau for the forecast for tomorrow's field-day, there are several services that provide ionospheric predictions. The Australian Space Weather Service, SWS, is one of those. You might have previously known it as the Ionospheric Prediction Service, but Space is much more buzz-word compliant, so SWS is the go.

If you're not a radio amateur, space weather can impact stuff here on Earth, like the ability to communicate, transfer energy across the electricity grid, use navigation systems and other life-essentials. The SWS offers alerts for aviation and several other non-amateur services.

If you're interested in HF communications, the SWS offers HF prediction tools that allow you to check what frequencies to use to communicate with particular locations using visualizations like the Hourly Area Prediction map.

If you're more of the Do-It-Yourself kind of person, you might be pleasantly surprised that you can have your very own ionospheric monitoring station at home. Not only that, it's probably already in place, configured and ready to go.

If you're using WSJT-X to monitor WSPR transmissions, then you'll have noticed that the screen shows all the stations you've been able to decode and you can scroll back as far as you like to the time when you launched WSJT-X.

If you want to do some analysis on that, copy and paste is an option, but it turns out that there's a handy little document being stored on your computer called ALL_WSPR.TXT that contains the very same data going back to when you installed and launched the first time.

This information represents what stations you heard, at what time and with what level of signal to noise at your shack, not some fancy station in the middle of nowhere with specialist hardware, your actual station, the one you use to talk to your friends, with your antenna, your power supply, the whole thing.

For my own entertainment I've been working on a way to visualize this. I created a map that shows the location every station I've logged, 30,000 of these reports in the past four months. It's interesting to see that I can hear most of the globe from my shack. Notably absent is South America but that is likely a combination of band selection and local noise.

In the meantime I've gone down another rabbit hole in figuring out if I can use an image file to visualize all this without needing fancy software, unless you consider a web-browser and bash fancy.

The idea being that a simple script could take the output from your station and convert that

into a map you can see on your browser. In case you're wondering, I'm thinking that a style-sheet attached to a Scalable Vector Graphic or SVG might be just the ticket to showing just how many times I've heard a particular grid-square.

If you have ideas on what else you might do with this data, get in touch.

~ I'm Onno VK6FLAB

New day, new mode ... SSTV

In 1958 The Kentucky Engineer published an award winning student article by Copthorne "Coppie" MacDonald. He described a Slow-Scan T.V. System for Image Transmission. If you get the opportunity, have a look for the link on his archived home-page which you can find from the Wikipedia SSTV page.

The purpose of this narrow band television idea was to be able to send images using cheaper equipment and less bandwidth than normal television. The idea caught on and it's still in use today.

In 1959 the idea of slow scan tv was used by the Luna 3 mission to transmit images from the far side of the moon. The NASA Apollo program also used SSTV to transmit images from Apollo 7, 8, 9 and from the Apollo 11 Lunar Module.

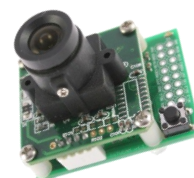
In 1968 SSTV became a legal mode for radio amateurs in the United States.

The International Space Station regularly uses SSTV to send images to radio amateurs across the globe.

The version of SSTV in use by radio amateurs today is different from the earlier grainy black and white images coming from the moon and if you're expecting a moving image, something that TV implies, you're going to be disappointed, since the popular SSTV modes send images one at a time, taking up to a minute or so to send. With a frame-rate of one frame per minute, watching anything other than grass grow is going to be a challenge.

That said, SSTV is a lovely and relatively simple way of sending images across the air.

In my quest for new adventures I like to play with things I know nothing about. I suspect that it's ingrained but it does keep me off the street. The other day I received an email from a local amateur, Adrian VK6XAM, who sent a message describing a new SSTV repeater he'd set-up for testing purposes. It's a local 2m repeater that waits for an activation tone, then it expects you to transmit an SSTV image and it will replay the image back to you. If you're familiar with a parrot repeater, this is a similar thing, just for



All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: [@vk6flab](https://twitter.com/vk6flab) or check the website for more: <http://vk6flab.com/>

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: <https://www.facebook.com/groups/foundations.itmaze>

This podcast episode was produced by Onno (VK6FLAB). You can find more at <http://vk6flab.com/>

SSTV rather than audio. The repeater is running on solar power and with the 100% duty cycle of SSTV, it's only available during daylight hours.

Technicalities aside, I couldn't resist.

So, I fired up QSSTV, a piece of Linux software that among other things knows how to receive and send SSTV images. After turning on my radio, tuning to the correct frequency, I received my first ever SSTV picture.

On a bright red background a yellow symbol appeared. At first I thought it was a hammer and sickle, but on closer inspection it was a micrometer and caliper, which absolutely tickled my fancy, having just taken delivery of some precision measuring tools - a Mitutoyo Test Indicator and a few other bits and pieces for another project I'm working on.

Had to learn how to drive QSSTV, make a template so you can overlay text on an image, learn what a signal report should look like, then when I figured all that out I triumphantly hit send and it made all the right noises, but nothing was happening.

More time looking at the inter-web taught me that if I want to use the rear connection on my FT-857d to send audio using FM, as opposed to SSB which is what most digital modes need, you need to set the radio to PSK mode and magically it starts to work.

My first ever SSTV image was sent an hour and a half after receiving my first image and the repeater dutifully sent it back. Then I got a picture from Keith VK6WK.

Of course the paint isn't even dry on any of this, so there's plenty more to learn, but the process is not too complex.

I will note a few things.

I had already set-up digital modes, that is, my radio was talking to my computer via CAT, that's Computer Assisted Tuning, essentially a serial connection that controls the radio and the audio was already being sent and received from the rear connector of my radio.

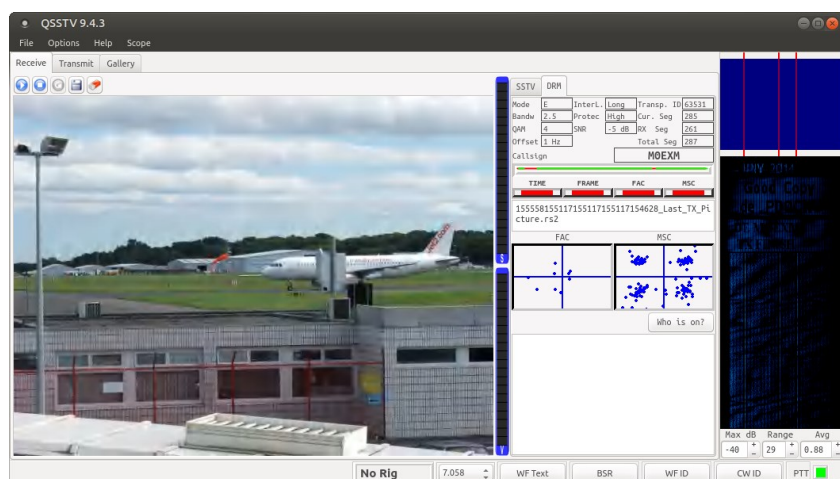
Getting SSTV running was really an extension on those activities, so if you're going to do this, take some time to make things work. I continue to recommend that you start with WSJT-X since it helps you get your levels and connections right.

Now I suppose I should start playing with SSTV over HF, but first I would like to figure out how to make the templates work better for me and how to actually seriously log an actual contact.

More adventures ahead!

Remember, have fun, play, get on air and make noise!

~ I'm Onno VK6FLAB



No-Ham Recipes

Heather Brodie

Pineapple Cake



This is an easy cake, but I always get asked for the recipe when I serve it:

Pineapple Cake

- 1 1/2 cups white sugar
- 2 cups all purpose flour
- 2 tsp. baking soda
- 2 large eggs
- 2 cups crushed pineapple with juice
- 1 tsp. vanilla

Frosting

- 8 oz. cream cheese, softened
- 1/2 cup soft butter
- 1 1/2 cups icing sugar
- 1 tsp. vanilla

For the cake:

Combine dry ingredients together then add pineapple, eggs and vanilla. Mix till well combined. Pour into a greased 9 x13 pan and bake at 350F for about 45 - 50 minutes.

For the frosting:

Beat the cream cheese and butter together till well combined then add icing sugar and vanilla. Spread on the cooled cake.



Social Reminder

The Surrey weekly social gathering is on Saturday at the Kalmar Restaurant at 80th and King George Boulevard between 7:30 and 9:30 am. You don't have to be a SARC member to participate. Bring your significant other, bring your family, see old friends and have fun.

Back to Basics

John Schouten VE7TI

From The Canadian Basic Question Bank

Bandwidth



Bandwidth is a term that pops up frequently in the Canadian Amateur Radio Basic question bank, and throughout the course. It is a factor of antennas, modulation and transmitters, receivers, propagation, interference and suppression and proper operating procedures. As a result there are several dozen questions that mention the term.

Here are three sample questions:

B-006-009-002 How can the bandwidth of a parasitic beam antenna be increased?

- A Use larger diameter elements
- B Use traps on the elements
- C Use tapered-diameter elements
- D Use closer element spacing

B-7-4-9 How does the bandwidth of a transmitted signal affect selective fading?

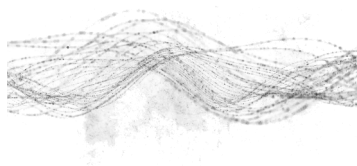
- A It is the same for both wide and narrow bandwidths
- B Only the receiver bandwidth determines the selective fading effect
- C It is more pronounced at narrow bandwidths
- D It is more pronounced at wide bandwidths

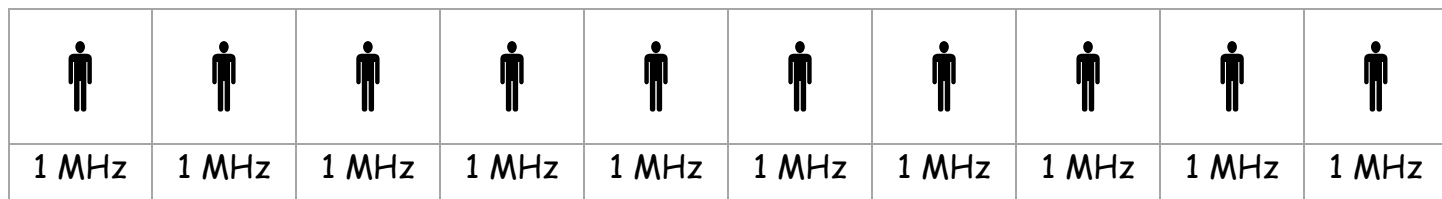
B-003-013-006 What is the usual bandwidth of a frequency-modulated amateur signal for +/- 5kHz deviation?

- A Greater than 20 kHz
- B Between 10 and 20 kHz
- C Less than 5 kHz
- D Between 5 and 10 kHz

Bandwidth is the difference between the upper and lower [frequencies](#) in a continuous [band of frequencies](#). It is typically measured in [hertz](#),

Bandwidth in hertz is a central concept in many fields, including electronics, information theory, digital and radio communications, signal processing, and spectroscopy and is one of the determinants of the capacity of a communication channel. For other applications, there are other definitions. One definition of bandwidth, for a system, could be the range of frequencies over which the system produces a specified level of performance. A less strict and more practically useful definition will refer to the frequencies beyond which performance is degraded. In its most basic form, it is the amount of 'space' occupied by a signal within the entire electromagnetic spectrum. Let's try to put that in simpler terms.

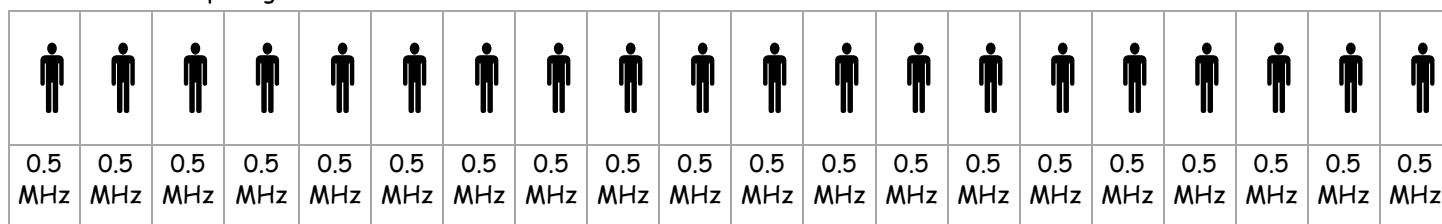




Wide spacing / 1 meter / 1 MHz



Narrow spacing / 0.5 meter / 0.5 MHz



In the top diagram above we have 10 people equally divided over 10 spaces. Their total occupied space is therefore 10 meters.

Each person takes up 1 meter of space. Each therefore occupies 1 meter of the total 10 meter width.

If we now talk about it in radio terms, we have a total of 10 meters of spectrum. Each person (signal) takes up 1 MHz of the radio frequency (RF) spectrum. Each therefore has 1 MHz of the total bandwidth.

In the bottom diagram we have the same 10 meters of bandwidth (the blue centre line) but now each person is only give 1/2 meter of space or, in radio terms, 0.5 meters of the total bandwidth. The signals are crammed a lot closer together and there is more likelihood of one person moving over or stretching into an adjacent space, thus **interfering** with an adjacent occupant.

The same happens in radio. When you transmit, your signal occupies a portion of the total RF spectrum. This may be in the 20 meter band, in the 2 meter band or elsewhere your Amateur certificate permits you to operate. Each band has defined limits set by the radio regulations in consultation with the International Amateur Radio Union (IARU). If your signal occupies more space than permitted, for example, you transmit FM voice on the 80 meter band, you

breach those regulations because your signal occupies more of the band than you are permitted.

I'll take this opportunity to briefly define wide and narrow band channel spacing. Certain radio services, for example, FRS has channels arranged in narrow band spacing. In other words, the channels are spaced like the bottom example above as opposed to wide spacing in the diagram at the top. This permits more users in a smaller portion of the available (expensive to license) commercial RF spectrum. Although there are bandwidth limits of your transmission in each band you are permitted to operate, Amateur Radio has no narrow banding requirements. This is where conflicts occur when people use amateur radio equipment (a wide band transceiver) on services such as FRS, LADD or RR frequencies that mandate a narrow band transceiver. All commercial radio equipment sold new must meet narrow band requirements. If you use an amateur radio or older commercial transceiver, your signal occupies more bandwidth, interfering with adjacent frequencies.

When we talk of filters, we can use our diagram again. If I try to pass a large individual into a space above, they may not fit. I can design a filter to restrict the width of a person (signal) that can pass through—a 'bandpass filter'. Similarly I can design a filter to let a range of

smaller people through, let's call that a 'low-pass filter' or conversely only larger people, a 'high-pass filter'.

If we are talking about antennas, 'Antenna Bandwidth' is the range of frequencies that an antenna can receive well, or a range of frequencies that we can transmit over that antenna without generating standing waves indicating signal can no longer pass and is reflected back to my transceiver (bad!). So if I build an antenna for the 2 meter band, I would expect it to pass 144-148 MHz—the **antenna bandwidth**—without excessive standing waves and that the standing wave ratio (SWR) is acceptable.

If I transmit with too much audio (overmodulation), I can exceed the bandwidth of the circuitry in the transceiver. Typically shouting, or having your microphone set too high leads to 'overmodulation' evidenced by distorted speech plus using excessive bandwidth on the air (splatter) which interferes with stations using adjacent frequencies ('out-of-channel emissions').

One advantage of carrier suppression in a double-sideband phone transmission is that amplitude modulation (AM) produces a radio carrier, an upper sideband and a lower sideband. The sidebands are the ever-changing sum and differences of the modulating frequency (follows the voice) and the carrier frequency which is set at the operating frequency). The carrier by itself does NOT convey information because the message is in the sidebands. Suppressing the carrier permits using the full capacity of the power amplifier for the sidebands. Suppressing the carrier and one sideband yields Single Sideband.

In propagation, an HF signal strikes the ionosphere. Some frequencies will bounce back, but the ionosphere is not a smooth mirror and your signal is not a pin-point but broad, depending on its bandwidth. This tends to distort the signal. Parts of a wave arriving with differences in phases (Selective Fading) cause a fluctuation in the perceived signal. Signals with large bandwidths are more susceptible to Selective Fading. Single Side Band (SSB) is less affected.

In auroral propagation (reflecting off the northern lights) the unstable front of the aurora and ensuing scattering of the radio wave make for distorted signals, only the smaller bandwidth signals are usable.

In order of bandwidth requirements, CW requires about 100 Hz, RTTY about 600 Hz, SSB 2 to 3 kHz, and FM is a bandwidth hog, requiring 10 to 20 kHz; but then you probably know that because FM transmissions are usually much clearer due to the greater range of audio frequencies modulating the signal.

So, the answers to the questions we asked at the start of this 'Back to Basics'?

B-006-009-002 How can the bandwidth of a parasitic beam antenna be increased?

The answer is (A), 'Antenna bandwidth' is the range of frequencies over which an antenna is usable. Larger-diameter elements means "thicker" elements. With "fatter" elements, resonance isn't as sharp. Antenna 'bandwidth' is increased.

B-7-4-9 How does the bandwidth of a transmitted signal affect selective fading?

The correct answer is (D), it is more pronounced at wide bandwidths.

B-003-013-006 What is the usual bandwidth of a frequency-modulated amateur signal for +/- 5kHz deviation?

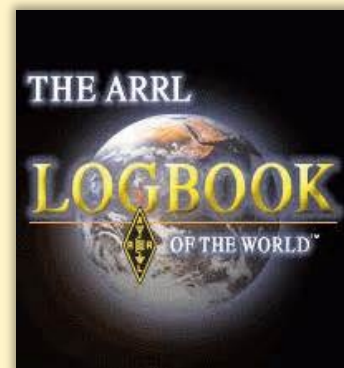
The answer is (B), between 10 and 20 kHz. Plus or minus 5 kHz deviation would mean 5kHz above and below the centre frequency for a total of at least 10kHz of bandwidth.

The following video may shed some additional light on the concepts of waves, frequency and bandwidth: https://youtu.be/tQT0kZo_QDM

~ John VE7TI

Logbook of the World (LOTW)

Logbook of the World (LoTW) is a web-accessed database provided by the American Radio Relay League (ARRL) to implement a contact verification service among amateur radio operators. Using LoTW, radio amateurs can claim and verify contacts (QSOs) made with other amateurs, generally for claiming credit for operating awards, such as DXCC. This kind of verification formerly required exchange of paper QSL cards and submission to ARRL, a slow and somewhat expensive process. LoTW began operation in 2003.



LOTW user guide

If you are a new user or planning to use "Logbook of The World" (LoTW), Gary, ZL2IFB, has put together an easy step-by-step guide or should we say manual (about 33 pages with pictures) to help you use LoTW. The PDF file is available for download at:

https://www.g4ifb.com/LoTW_New_User_Guide.pdf

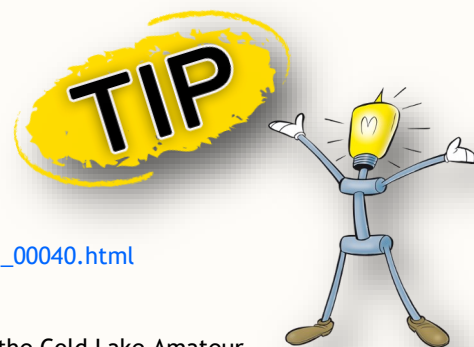
Study Links

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank.
<http://tinyurl.com/CanadaBasicQB>
2. Industry Canada (ISED) on-line practice page:
https://apc-cap.ic.gc.ca/pls/apc_anon/apeg_practice.practice_form
3. The Amateur Radio Exam Generator is at: https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/examiner-v2-5/>
5. There are plenty of good resources for both basic and advanced exam study courtesy of the Cold Lake Amateur Radio Society at: <http://www.clares.ca/va6ha1%20training.html>

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year's free SARC membership!

Newly Licensed? When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive The Canadian Amateur magazine for one year.



New "Successful Guide to the Basic Exam"

I recently received an email from Vic VE3YT. He teaches a CW course and helps out with the Basic course at the local Kitchener Waterloo amateur radio club

In the past year or so Vic, worked with that club on their beginners course and his XYL, who is now VE3UXD, in her efforts to prepare for the exam. In his email he wrote that he has come across a broad swath of candidates who feel the RAC "green book" does not directly address the exam questions, noting: "These people stop reading the RAC book and start trying to learn by taking practice exams, and looking things up when they don't understand the question." It echoes what we have learned from offering our SARC courses. Many Basic students also find the book provides much more theory than necessary for the Basic exam. At SARC we ask students for feedback following their exam. This feedback indicates overwhelming satisfaction with our own manual and course materials that reflect the questions. We still offer the book as an option for those wishing a more detailed manual.

Vic took all the questions in the Canadian basic question bank and wrote a 103 page study guide that he's calling the "Successful Guide to the Basic Exam" to avoid using the same name as RAC. It is organized according to the B numbers, using the 8 ISED categories and the subcategories of the B numbers. It's easy for a student to look something

up when they don't get a question. Working from the questions and answers, in bold, he puts enough text around it to give context and enable the student to learn the material in a way that it sticks with them.

With most clubs, he sends the "educational coordinator" the intro and first chapter, on Regulations and Policies. Vic has put a blurb up at www.ve3yt.com

I have seen the entire guide and I'm impressed. If a Basic class student (or a student not taking a formal class) wants a concise review of the questions and brief explanations, this may be of benefit.

Vic is selling this guide as a pdf for \$20. His current model is "you e-transfer me \$20 and I email you a pdf. Of that \$20, I give \$10 to the KW club for their educational efforts."

Vic says his goal here isn't to get rich, it's to a) write the most useful guide ever for students, and b) to make students feel that people in this hobby are welcoming enough to help them with a guide tailored to the exam, and c) to help more hams get licensed, and d) to start them down the path of thinking about supporting club educational efforts by showing we care about that.

~ John VE7TI

**Successful Guide to the
Basic Exam
for the
Canadian Amateur Radio
Operator Certificate**

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Version 1.0 September 2020

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The Most Efficient Guide for the Basic Exam

- Focuses only on the exam material
- Organized by ISSED's Eight Categories and questions
- 103 Pages, emailed to you as a pdf
- Uses the same language as the exam questions
- Helps you understand and remember the material
- Explains "tricky" questions
- E-transfer \$20 to vicd@uwaterloo.ca, of which \$10 supports the Kitchener Waterloo club's educational work.

www.ve3yt.com for the guide, my intro book and [cw](#) course

IARU Region 1 President Sounds Alarm on Wireless Power Transfer for Vehicles

International Amateur Radio Union (IARU) Region 1 President Don Beattie, G3BJ, wants to raise greater awareness regarding the interference potential of Wireless Power Transfer for Electric Vehicles (WPT-EV). He is urging IARU member-societies to contact national regulators to make them aware of the technology's potential for "RF pollution." Beattie notes that WPT-EV chargers can run as much as 20 kW.

WPT-EV was on the agenda for World Radiocommunication Conference 2019 (WRC-19). The International Telecommunication

Union (ITU) Radiocommunication Sector (ITU-R) conducted studies to assess the impact of WPT-EV on radiocommunications and suitable harmonized frequency ranges. Those ITU-R studies identified the 19 - 25 kHz band, as well as bands in the 50 kHz and 60 kHz range, for high-power WPT-EV, and the 79 - 90 kHz band for medium-power WPT-EV. The consensus of WRC-19 delegates was to make no changes in the ITU Radio Regulations with respect to WPT-EV.

The Netherlands' IARU member-society VERON has posted the text (translated into Dutch) of Beattie's remarks on the subject.

"The discussions about WPT-EV have reached a point where they are moving from the technical to the political arena," Beattie said. "Discussions with a national regulator indicate that we must now take action at the national level. The amateur service, but also other telecommunication services, will experience the consequences of WPT-EV."

Beattie urged member-societies in Region 1 to contact national regulators, preferably in person, to explain why radio amateurs are so concerned. He pointed out that long charging times in populated areas could generate harmonics that make radio

communication very difficult. "Models show that this also applies to the wider environment of a WPT-EV installation," Beattie said. "Broadcasters, stationary, and mobile services share these concerns" and provided input to CEPT Electronic Communications Committee Report 289.

Beattie noted that the WPT-EV discussion has been going on for a long time. The technology is similar to that used for wireless charging of cell phones.

"The wireless charging of electric cars is done with large coils," he explained. "One of them on the ground under the vehicle, the second in the car. Typically, about 22 kW is transferred wirelessly through those coils. This is done using frequencies between 79 and 90 kHz. Technical and operational standards for WPT-EV are under development."

WPT-EV developers are seeking noise level limits that are some 30 - 45 dB above current noise levels, Beattie said. "Limits that have a serious negative effect on the radio spectrum," he asserted.

"In the interests of the future of amateur radio, we need to get the attention of national regulators," Beattie concluded. "This is about the future of amateur radio!"

Calling all New Amateurs: Get your Name in Lights!

Did you get your Amateur Radio certificate within the past year or two and want to introduce yourself through TCA to the Amateur Radio community? If so we would love to hear from you.

Drop a line to tcamag@yahoo.ca and tell us how you were introduced to the magic of Amateur Radio.

Do you credit any particular Amateur ("Elmer") with getting you started? Which aspect of the hobby do you enjoy so far?

Please be sure to include your name, call sign, date and level of certificate – and don't forget to include a photo or two. We hope to hear from you soon!

November 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3 1930 SEPAR Net 2000 SARC Net	4	5	6	7 7:30-9:30 AM SARC Social: Kalmar Family Restaurant 8076 King George Blvd, Surrey, BC CONTEST: ARRL Sweepstakes CW
8 CONTEST: ARRL Sweepstakes CW	9	10 1930 SEPAR Net 2000 SARC Net	11 Remembrance Day 1900 SARC General Meeting	12	13	14 7:30-9:30 AM SARC Social: Kalmar Family Restaurant CONTEST: WAE DX Contest RTTY
15 CONTEST: WAE DX Contest RTTY	16	17 1930 SEPAR Net 2000 SARC Net	18	19	20	21 7:30-9:30 AM SARC Social: Kalmar Family Restaurant CONTEST: ARRL Sweepstakes SSB
22 CONTEST: ARRL Sweepstakes SSB	23	24 1930 SEPAR Net 2000 SARC Net	25 1900 SARC Exec Meeting	26	27	28 7:30-9:30 AM SARC Social: Kalmar Family Restaurant CONTEST: CQ WW DX (CW)
29 CONTEST: CQ WW DX (CW)	30					

For details on all SARC events, go to
ve7sar.net

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>

December 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
For details on all SARC events, go to ve7sar.net		1 1930 SEPAR Net 2000 SARC Net	2	3	4	5 7:30-9:30 AM SARC Social: Kalmar Family Restaurant 8076 King George Blvd, Surrey, BC
6	7	8 1930 SEPAR Net 2000 SARC Net	9 1900 SARC General Meeting	10	11	12 7:30-9:30 AM SARC Social: Kalmar Family Restaurant
13	14	15 1930 SEPAR Net 2000 SARC Net	16	17	18	19 7:30-9:30 AM SARC Social: Kalmar Family Restaurant CONTEST: RAC Winter Contest (CW, SSB)
20 CONTESTS: ARRL Rookie RU (CW) RAC Winter Contest (CW, SSB)	21	22 1930 SEPAR Net 2000 SARC Net	23 1900 SARC Exec Meeting	24	25 Christmas Day 	26 7:30-9:30 AM SARC Social: Kalmar Family Restaurant Boxing Day 
27	28	29 1930 SEPAR Net 2000 SARC Net	30	31 New Year's Eve 	1 New Year's Day	2 Happy 2021

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>

SURREY AMATEUR RADIO COMMUNICATIONS

VE7RSC—SARC's Repeaters

John Brodie VA7XB

SARC Has a New Repeater



Part 1 SARC Has a New Repeater

Some of you may not be aware that SARC has two repeater sites. Attention has recently focused on both systems because of the introduction of severe noise which has seriously affected performance. It seemed like an appropriate time to review our repeater system, and in Part 2 reiterate good advice received about resolving the problems.

SARC's North Site is located above the top floor of a 36 storey high rise in Central Surrey at 100th Ave and King George Blvd, with repeaters for 2m, 220 MHz and 440 MHz, transmitting as VE7RSC. The tone for all is 110.9 Hz. IRLP and Echolink are available on 2m and 440. Historically, we have had air quality problems at this facility, now remedied and no longer an issue but it has left the exterior of the equipment somewhat corroded.

SARC's South Site is located on a Telus tower near 128th St at 62 Ave. It had a 50-year old GE Master II machine also on 147.60 MHz (no UHF) including IRLP and Echolink until it was turned off two months ago in anticipation of installing a brand new Yaesu Fusion repeater for both FM and digital voice (C4FM). Access tone is 103.5 Hz.

However, the new Fusion repeater was also turned off on Oct 20th, in order to determine if severe noise heard on the North repeater was in some way originating from the South. It was soon confirmed that the South repeater is not the problem, as the noise heard on the North repeater continued unabated. By the time you read this, the Fusion repeater will likely be back on again (or maybe not) and available for both VHF digital voice and FM. This machine senses whether the signal is FM or digital and responds in the appropriate mode.

Michael Birtles VE7GMP and Slawa VE7LWW (also below) checking tuning of cavities.



SURREY AMATEUR RADIO COMMUNICATIONS

Options are being considered for the best way to use the Fusion repeater. One idea under consideration is to move it to the North site on UHF, then reactivate the old South repeater for VHF only. Also in the works is to install "Wires-X" providing interconnectivity around the world with other C4FM digital voice users via the Internet. A few members have purchased their own Yaesu Fusion gear for digital voice and are experimenting with this mode.

In practice, VHF listeners on 147.360 MHz will hear signals without knowing if the signal is coming from the N or S location. However, on transmit the N repeater will only respond to signals having a 110.9 Hz sub-audible tone and the S repeater will only respond to signals with a 103.5 Hz tone.

In order to prevent the 2 repeaters from interfering with each other, the "tail" on both has been shortened to a fraction of 1 second. In other words, after you stop pressing PTT on your radio, the repeater will turn off within 1 second. Many other repeaters around the Lower Mainland have a longer "tail" and stay on for several seconds.

Intermodulation

IM) or intermodulation distortion (IMD) is the amplitude modulation of signals containing two or more different frequencies, caused by nonlinearities or time variance in a system. The intermodulation between frequency components will form additional components at frequencies that are not just at harmonic frequencies (integer multiples) of either, like harmonic distortion, but also at the sum and difference frequencies of the original frequencies and at sums and differences of multiples of those frequencies.

~ Wikipedia

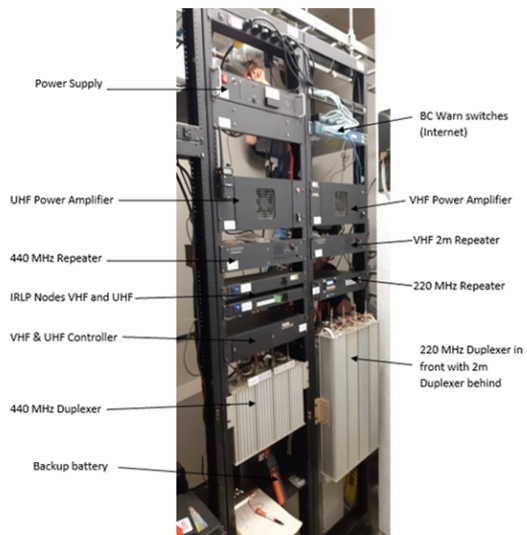
Part 2 - A Diagnosis of our Noise Problem

This brings us to the "noise", more accurately described as "intermodulation" heard during nets and other VHF contacts

Following is a description of the cause and the cure, as explained by Dave Cameron VE7LTD. Dave services repeaters professionally and was instrumental in SARC's initial repeater installation as well as remedying problems from time to time.

Recently a new radio station came back on the air in Vancouver - AM 600. <https://www.sherepunjabradio.ca/>. This was on the air in the 90's and 2000's and was a huge problem back then too.

This radio station is making a perfect intermod mix with MANY ham repeaters (not only VE7RSC). It is also affecting VE7RHS 145.270, VE7MFS 145.310, VE7RNV 147.260, and VE7ROX 145.150 (that I know of).



Our installation at the North site.



David Sinclair, VA7DRS making adjustments to the Yaesu System Fusion repeater located at the South site. The older VHF repeater is located on the rack below the Yaesu to which David is pointing.



YAESU DR-1 is a digital/conventional FM dual mode repeater that covers the VHF and UHF amateur radio bands. It was developed for use with System Fusion. Replacing your conventional analog FM repeater with the DR-1 will provide continued use of conventional FM communication while integrating the use of digital communication functions through its unique AMS capability.

SURREY AMATEUR RADIO COMMUNICATIONS



...it will be an issue for ALL VHF ham repeaters in the lower mainland and Northwest Washington...

With a sufficiently strong signal from 147.360 and 0.600 AM, you get two products made at any non-linear junction (like rusty bolts, bad antenna joints, PA transistor, preamplifier, etc). (Editor's note: see comment in Part 1 about "corrosion"). The mixing products are:

$147.360 \text{ minus } 0.600 = 146.760$ (not a problem, no receiver there)

$147.360 \text{ plus } 0.600 = 147.960$ (a BIG problem, right on the repeater input)

So it will be an issue for ALL VHF ham repeaters in the lower mainland and Northwest Washington right now, because they all run a 600kHz split.

The product contains a mix of the modulations from both sources, so you also end up with the subaudible tone from the repeater TX on the product, which self-keys the receiver, and you get that "feedback" squeal you are hearing.

If you listen VERY carefully, especially when the product is weak, you can hear the voice pulses on the radio station change the amplitude of the AM signal (hence amplitude modulation); the product amplitude changes and you can hear that.

I was able to link the radio station to the intermod the other day and could hear the voice pulses on the repeater when listening to both at the same time.

Next question - what can you do about it...

1. Reduce the TX power of the repeater. The amplitude of the product is proportional to the strength of the sources. This is also why it seems to come and go - as you know HF and MF signals often fade in and out over time, which defines why sometimes the product is there and sometimes not. Taking the power amplifier off the repeater will likely eliminate it.

2. Take the CTCSS tone off the output of the repeater. This will not get rid of the product, but it will prevent it from self-keying the repeater.
3. Hunt down where the mix is taking place, and remove it. The problem is likely in the PA of the VHF repeater or maybe the UHF or 220 repeater. You can try using circulators on the output of the repeaters, grounding or ungrounding certain components, etc. In order to do this, you really need to have a time of day when the interference is predictable. The you run around while it is happening shaking and banging metal round the site until you can hear a crackle.

To be honest, in 1999 the problem was bad for 145.270. But I found that on cold wet mornings, it was worst. I went to the site with a hammer and handheld and started banging around. I found that a piece of flashing on the roof was the biggest culprit. I jammed a piece of rubber between the two pieces and magically the problem went away.

~ John VA7XB

"Editor's note: Possibly a strong signal on the repeater input frequency of 147.960 MHz is also mixing with 600 KHz by subtraction to produce spurious noise on the repeater output frequency of 147.360 MHz. Remedies for the mixing problem on VHF are being pursued. The foregoing report should not be interpreted as suggesting that the 600 KHz AM station is in any way at fault for the intermodulation problem described, rather it is unfortunate that the standard amateur repeater offset happens to coincide with the broadcast frequency of a strong nearby AM signal."



SURREY AMATEUR RADIO COMMUNICATIONS

The SARC Contest Contender

RAC Winter Contest

John Brodie VA7XB



Here are some pics and statistics for the RAC contest. Thank you for participating on behalf of VE7SAR. I think we did quite well, considering poor band conditions.



RAC stats - Notepad

File	Edit	Format	View	Help							
Day	Hr	VA7FMR	VA7VJ	VA7XB	VA7XH	VE7KKG	VE7LWW	VE7TI	Tot	Accum	
2019-12-28	00	0	0	36	0	0	0	0	36	36	
2019-12-28	01	0	0	34	0	0	1	0	35	71	
2019-12-28	02	0	0	0	0	0	39	0	39	110	
2019-12-28	03	0	0	0	0	0	42	0	42	152	
2019-12-28	04	0	0	0	0	0	23	0	23	175	
2019-12-28	05	0	0	2	0	0	16	0	18	193	
2019-12-28	06	0	0	1	0	0	0	0	1	194	
2019-12-28	12	0	0	8	0	0	0	0	8	202	
2019-12-28	13	0	0	31	0	0	0	0	31	233	
2019-12-28	14	0	28	2	0	0	0	0	30	263	
2019-12-28	15	0	53	0	0	0	0	0	53	316	
2019-12-28	16	0	2	0	0	14	0	0	16	332	
2019-12-28	17	0	0	0	0	64	0	0	64	396	
2019-12-28	18	9	0	0	0	0	0	0	9	405	
2019-12-28	19	8	0	0	0	0	0	0	8	413	
2019-12-28	20	1	0	0	37	0	0	0	38	451	
2019-12-28	21	0	0	0	78	0	0	0	78	529	
2019-12-28	22	0	0	0	0	0	0	28	28	557	
2019-12-28	23	0	0	55	0	0	0	4	59	616	
Total	0	118	83	169	115	78	121	32	616	616	

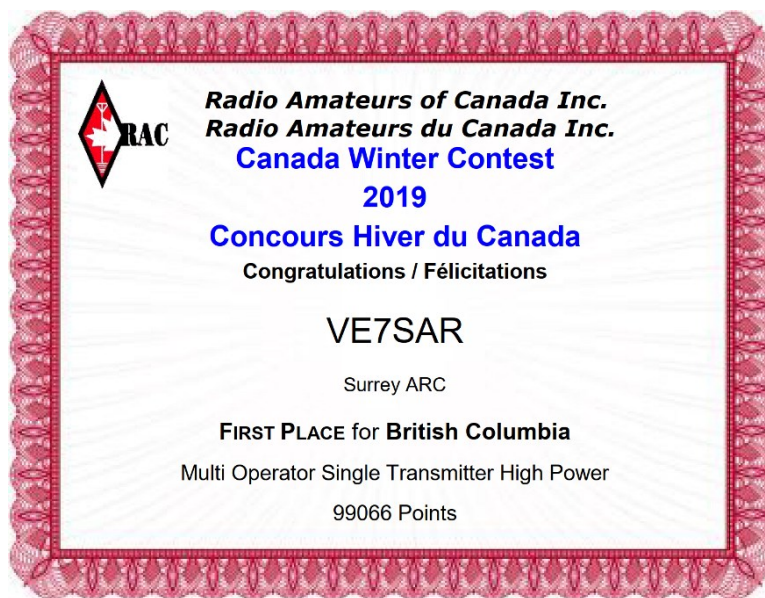
On-Line Contest Server showed these results:

CATEGORY		Band	Mode	Pwr	Rank	Call : 103	Score	Q S O							
Oper	Trx							Total	160	80	40	20	15	10	Total
MULTI-OP	ONE	ALL	MIXED	H	1	VO1A	212534	852							47
				H	2	K3AJ	191520	620	79	160	161	214	6		56
				H	3	VE7SAR	99066	616		105	190	320	1		33
				L	4	W4VS	51912	208	9	25	69	93	12		36
				L	5	N9VPV									
MULTI-OP	ONE	ALL	CW	H	1	WO1N	5040	110	4	66	14	26			10
MULTI-OP	TWO	ALL	MIXED	H	1	VE7RAC	261632	936	25	73	185	586	67		56



SURREY AMATEUR RADIO COMMUNICATIONS

The SARC contest team scored another noteworthy accomplishment in the RAC Winter Contest.



An HF “Renaissance”: Militaries reinvests in shortwave communications

LONDON — Special operations commands across Europe are ramping up their capabilities with high-frequency communications to ensure connectivity on the battlefield. Leaders there are turning to high frequency communications as a way to optimize properties that provide a low probability of interception and detection.

Special forces in France, Germany, Poland and Ukraine continue to receive high-frequency, or HF, systems as a way to diversify communications plans, industry sources confirmed to C4ISRNET.

Some special operations organizations have selected L3Harris’ AN/PRC-160(V), industry sources said.

Enhancements in HF come at a time when NATO members and partner forces are suffering from a disruption of satellite communications, particularly along the alliance’s eastern flank where Russian armed forces continue to conduct electronic warfare.

In an online presentation to the Association of Old Crows on Aug. 6, Paul Denisowski, product management engineer at Rohde and Schwarz North America, described how communications satellites are vulnerable to antisatellite systems as well as ground-, air- and space-based “kill vehicles.”

“China, Russia and the U.S. have all carried out ASAT tests and many other countries are developing ASAT capabilities,” Denisowski said, using an acronym for anti-satellite. To boost resilience, some commands are turning to high-frequency communications.

During the presentations “Lost Art of HF” and the “Rebirth of Shortwave in a Digital World,” Denisowski explained that HF is making a comeback in local and global communications. This renaissance comes as the result of improvements in a range of fields, including antenna design, digital modulation schemes and improved understanding of propagation.

Read the full story [here](#).

~ c4isr net

SURREY AMATEUR RADIO COMMUNICATIONS

The Contest Contender

The light went on at ARRL!

John Schouten VE7TI



Following up on my article about the benefits of Distributed Multi-op Contesting during this pandemic [The Communicator Aug-Sep 2020 and RAC TCA magazine], I sent an email to the ARRL suggesting they follow RAC's example for responsible team contesting. This update came out on October 22, 2020:

Guidelines Issued for ARRL DX Contest Multioperator Stations

ARRL has issued guidelines for multioperator stations competing in the ARRL DX Contest (CW and phone). With the global pandemic continuing to impose restrictions on social gatherings, multioperator contest stations may not be able to operate normally while still adhering to local social distancing guidelines. ARRL has taken the decision to make temporary accommodations for a multioperator station to participate as a team in these popular ARRL contests, under the following guidelines:

- Team members may operate from their home stations in conjunction with the multi-op station.
- Their home station must be located within a radius of 100 kilometers (62 miles) of the multiop contest station.
- Their home station must be located within the same DXCC entity as the multiop contest station. In the case of US and Canadian stations, the team member station must be in the same US state or Canadian province.

- All team member stations must use the same call sign and exchange as the multiop contest station for the duration of the contest.
- Logging software must be networked, so that all team member stations are using a common log.
- Individual operators may not work the multiop contest station or other team member stations using a personal call sign or other call sign.
- All multioperator rules, such as band changes and number of signals on a band, still apply. See the full contest rules for details.
- The team must determine and control band assignments, ensuring that no more than one team station is transmitting on any given band at a time.

The multiop contest station may be staffed at less than full capacity while maintaining safe practices, so operating with a combination of team members at home stations and team members at the contest station is permissible.

The CW contest takes place on the third full weekend in February (February 20 - 21, 2021). The phone contest takes place on the first full weekend in March (March 6 - 7, 2021).

For questions, contact the [ARRL Contest Branch](#).

Will other major contest follow? We hope so.

”

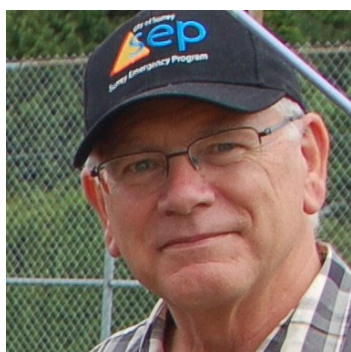
...ARRL has taken the decision to make temporary accommodations for a multioperator station to participate as a team...

SURREY AMATEUR RADIO COMMUNICATIONS

Radio-Active

John Brodie VA7XB

Profiles Of SARC Members



John Schouten VE7TI

A native of the Netherlands, John moved to Canada as a child and has lived in the Greater Vancouver area since 1960. After thirty plus years with the Vancouver Police Department concluding with his position as Deputy Chief of its Support Services Division, he retired in 2003.

Vancouver-based [E-Comm](#) is the first point of contact for 9-1-1 callers in 25 regional districts in British Columbia, handling over 1.8 million 9-1-1 calls a year (99 per cent of B.C.'s 9-1-1 call volume). E-Comm also provides dispatch services for police and fire departments and operates the largest multi-jurisdictional, tri-service wide-area radio network in the province used by police, fire and ambulance personnel throughout Metro Vancouver and parts of the Fraser Valley.

The E-Comm project was born out of the communications difficulties that became apparent in Vancouver and the Lower Mainland region during a major riot that followed the 1994 Stanley Cup playoffs.

Because of his familiarity with emergency planning and communications, John was asked to participate in the E-Comm planning group. The project also included City of Vancouver Emergency Planning which wanted to establish their Emergency Operations Centre (EOC) under the umbrella of the E-Comm/9-1-1 project.

John and his police colleague, Kevin VE7ZD / KN7Q lobbied hard over a period of eighteen months to ensure an amateur radio presence at E-Comm and full integration of amateur radio into the region's emergency planning and response.

This proposal included the creation of a provincial Society called [VECTOR](#) (Vancouver Emergency Community Telecommunications ORganization) and a partnership between the society and City of Vancouver for amateur radio communications as part of civic emergency planning and community events.

John's proposal was successful. VECTOR was incorporated as a provincial Society in 1999 and granted both a start-up and annual budget by the City of Vancouver sufficient to establish and maintain a first-class amateur station within the \$25M E-Comm facility.



At the station controls of VE7SAR

SURREY AMATEUR RADIO COMMUNICATIONS

Following his retirement in 2003, John became a Director at E-Comm, a position he held for the next five years.

Membership in VECTOR averaged around 100 hams from fairly early on and the organization continues to be very successful due in large part to its close ties and strong support from the City. VECTOR members and others are activated for the Celebration of Lights, The Vancouver Marathon, the Santa Claus Parade and a number of other annual community events. This also included the infamous Y2K response where it was believed many critical infrastructure systems would fail. They did not, but VECTOR members were ready to augment Vancouver Police and Fire communications at midnight should they be needed.

John's involvement with VECTOR, and as the PEP SW Regional Amateur Radio Representative, continued in 2003, when it was called upon by the BC Provincial Emergency Program to send a team of 8 hams to the Kelowna wildfires to assist with communications. Also in 2003, through VECTOR, John was involved in the set of presentations made to the International Olympics Committee (IOC) on Vancouver's proposal to host the 2010 Winter Games. This was the same year that John played a leading role in VECTOR'S conversion of a surplus diesel transit bus into a mobile communications post available to assist at large residential fires and other Emergency Social Services (ESS) call-outs.

Since 2007, John has been a member of SEPARS (the Surrey Emergency Program Amateur Radio Society) and Surrey Amateur Radio Communications (SARC, formerly Club). In addition to serving as Director on all the aforementioned organizations he is also the editor of the widely-acclaimed magazine, 'The Communicator', a bi-monthly publication of SARC, which at last count has a world-wide readership of over 5,000 downloads per month in 93 countries and all continents except Antarctica (so far—Ed).

At the same time, John maintains a social media presence for SARC on Facebook, Twitter and YouTube.

John is an active experimenter and builder of ham radio equipment, an avid contester, and a frequent contributor to the official journal of RAC, The Canadian Amateur. He is active on HF and VHF/UHF, both traditional analog and digital modes, and amateur satellite operations.

In 2015 he succeeded in making a Field Day contact with Astronaut Reid Wiseman KF5LKT aboard the International Space Station NA15S, which was featured on Global News television, see: <https://youtu.be/27HU9NIZbys>

Since 2001, when John began teaching amateur radio basic certification courses, he has created his own individual course and manual which is offered in the classroom to the local community each Spring and Fall, graduating 20-40 students a year. Recently, in response to COVID concerns, the course continues on-line for those students who wish to have an alternative to the classroom. As part of the course, John conducts workshops for students to learn about antennas and construction projects that will aid their understanding of electronic concepts.

He was awarded the PEP Communications volunteer of the Year in 2003.

John's personal interests in Amateur Radio have involved him in many club activities over the years, including Field Days as a representative of VECTOR, SARC and SEPAR. He believes that community events afford a great opportunity for training and experience, because they



*[top to bottom]
Provincial communications volunteer
of the year award—2003*

*As Vancouver EOC Operations Chief
during the annual Celebration of Lights*

*John near the conclusion of his career
with the VPD in 2003*

Woodworking is John's other passion



SURREY AMATEUR RADIO COMMUNICATIONS



simulate so many unique circumstances that a ham operator might face under emergency circumstances.

John is fortunate to be joined in the hobby by his XYL Paulette VE7VPE. She has also taken an active role in ham radio, serving as past president for the Canadian Ladies' Amateur Radio Association (CLARA). John's daughter and son have also become licensed hams, and we can look forward to the prospect of John's eight grandchildren eventually joining the amateur radio community.

[VE7TI - Callsign Lookup by QRZ Ham Radio](#)

["Hamstrung"](#) an article in the Vancouver Courier (2003)

~John VA7XB & Kevin VE7ZD / KN7Q



[top to bottom]

The VECTOR Community Emergency Response Vehicle (CERV) at VECTOR Field Day 2004. John worked on the transit bus conversion building and installing the inside cabinetry.

John and SARC's 'BigFoot'

Contest coaching a young Amateur at the OTC

[right] John and Shadow III in 1977, and with Sarge II in 1991. He describes them as the best two police partners he ever had...

"They were better than me at finding and chasing crooks, always had my back, didn't smoke or tell bad jokes, never came to work with a hangover, did everything I told them to and they were always happy to see me."

[below] Working satellites in the Palm Springs desert; home station and with two of the grandkids.



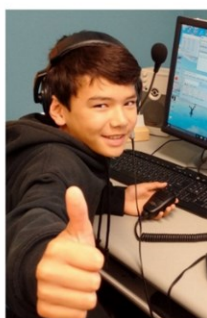
SURREY AMATEUR RADIO basiccourse

OBTAIN YOUR FEDERAL AMATEUR RADIO CERTIFICATE

JANUARY 19, 2021—8 WEEK TUESDAY EVENING COURSE

for information contact sarc@ve7sar.net

Surrey Fire Services Training Centre • 14901 64 Avenue • Surrey
(limited classroom seating or attend on-line)



- Ideal for outdoors activities. Long range communications anywhere for free without commercial infrastructure
- Use satellite communication to speak around the world, perhaps even to an astronaut
- Participate in 'Radio Sports' like Contesting and Hidden Transmitter Hunts
- Enhance your personal and your community's preparedness in an emergency
- Use a radio, computer, smartphone or tablet for free worldwide digital communications
- Practice an exciting hobby or start a career opportunity



SURREY AMATEUR RADIO COMMUNICATIONS



Annual General Meeting

September 10, 2020

Attendees: 25 in attendance (23 members and 2 non-members + 8 Proxies)

Meeting Start: 7:06pm

Location: Surrey Fire Training Centre

Announcements

1. Welcome

The 2020 SARC AGM was called to order by Vice President Anton James VE7SSD.

Anton welcomed the group to the SARC AGM and thanked them for attending at this unprecedented time in our lives. We confirmed the quorum in order to qualify this meeting as an AGM.

John Brodie confirmed 100 paid members including another 8 paid members as of tonight. 27 attendees are required for a quorum.

A discussion ensued about the interpretation of a quorum as stated in the by-laws continued around the room. The bylaws do not account for the unique situation of a pandemic and that needs to be considered. It was decided among those in attendance that proxies are to be included as members present for the purpose of the vote and fulfils the requirement of quorum.

Sheldon W: Would like to request that the directors consider changing the wording of the bylaws.

Agenda

1. Welcome, call to order and confirmation of quorum
2. Approval of the agenda
3. Approval of 2019 AGM Minutes
4. Presentation and approval of annual financial statements
5. Announcements
6. Committee Reports
7. New and other business
8. Election of Directors
9. Adjournment

2. Approval of the agenda of AGM 2020

Anton moved that we accept the agenda as presented. Jinty and John Schouten seconded. Carried

3. 2019 AGM Minutes

Jeremy Morse: I have prepared 2 printed copies of the 2019 AGM minutes and am prepared to read them aloud if required.

Gord Kirk: Moved that we accept the minutes from 2019 as emailed out. Ion Marinescu seconded. Carried

4. Presentation and approval of annual financial statements

Steve McLean: In the absence of our treasurer Scott Hawrelak, Steve provided the financial details on screen and asked if there are any questions. Arthur Siemens moved that we accept the Financial reports as presented. Elizabeth Gilchrist seconded. Carried

5. Announcements

Anton: The next general meeting is still not confirmed yet and details on that will follow at a later time.

John Schouten: We may not have the training facility available next month and we may need to move to Thursday nights.

Anton called for a health and welfare report.

Bill Little VA7ZBL became a silent key this summer, he was a past member of SARC and served as a director.

Chris Cowx VA7CWX had reported some serious health issues and we are trying to confirm his condition. We are wishing him a speedy recovery. *[Update: Chris is doing well and back to work full time].*

SURREY AMATEUR RADIO COMMUNICATIONS

6. Committee Reports

President's report

Stan Williams: This has been a very tough year so far for the club in getting things organized and getting things done. Stan thanks everyone in the group for their patience this year and provided a summary of the activities that were able to take place. Many members participated in Field Day as 1A stations remote from one another. Anton was able to pull together the Fox Hunt this year in the fall along with help from Les and Amel. We still do not have a group station available to us this year but an update on that should be provided soon.

Ham Course

John Schouten: We had a very busy course in progress in the spring and we were able to have session 3 before the pandemic started and we lost the access to the training centre. There was a 1 week pause while the remainder of the course was altered to teach online using a software package called Canvas. The online method was successfully used to finish the course, and in June a full online course was run without access to a classroom. We had students from as far away as Calgary and a few from Vancouver Island. We are now preparing for the next course and are anticipating this to be in the classroom with social distancing although we are restricted to 15 students. Those that are more comfortable online or farther remote will be able to take the course online. We still need to test the bandwidth of the training centre to be sure that works for videos and the training.

Morse Code Class

Kevin McQuiggin: We did run a Morse code class in Jan/Feb and made it to the end of the course before COVID struck and we were restricted from being able to complete the course. We did carry on after the COVID restrictions by doing some code practice on the repeater after the net on Tuesdays. The practice sessions on the repeater were run for about 3 weeks by Kevin/John B who hosted the sessions. We had about 25 people in the class and everyone completed the course. About half of those attending took the exam and were successful in passing. There are still a few students that were not able to complete their

practice sessions and exam. Perhaps if we can offer the course again we could pick up those that wanted to finish along with new students. The students were from all over the valley and not just Surrey so there was a great deal of enthusiasm for the course.

Communicator

John Schouten: We are now at 1 issue every 2 months or 6 issues per year. Our readership is ever increasing. Approx 5,000 copies per month go out to about 93 countries. Fair bit of feedback from people who think it's great and RAC has come on board and is asking to re-publish some of our content in their magazine. Everyone is welcome to contribute whether it's an ad, photo, or observations and it's been extra tough finding local material without having our usual get togethers and events.

John Brodie: There are two things that have helped put SARC on the map and it's been the Communicator and the Ham Classes so we owe a lot of thanks to John Schouten. A round of applause is given for John's great efforts.

Kevin McQuiggin: I am one of the people that helps John with the proof reading of the Communicator (along with John Brodie and others). People don't realize that John puts hundreds of hours into each issue. It's a fantastic magazine and I would not call it a newsletter. I think we should all recognize he does such a great job on it. Another round of applause is given for John.

Membership/Contest Report

John Brodie: Membership has been covered at the intro. Our contesting ground to a halt when COVID came along. We used to participate in a dozen contests a year on SSB/Digital/CW—almost one per month. Before COVID hit we did participate in the BCQSO Party Contest. We formed a CW team: John Brodie VA7XB, Jan Vozenilek VA7VJ, Les Tocko VA7OM. We won the contest in the high power multi op category and have received a nice award plaque for the group along with individual awards. We hope to get back to contesting more when things return to normal.

SURREY AMATEUR RADIO COMMUNICATIONS

Website Report

Jeremy Morse: The website has been running fine but recently there were some issues with 1-2 of the PayPal buttons. The buttons were eventually fixed after some trial and error. There is also a new PayPal button that allows you to make an annual subscription. A subscription can be a convenient option if you want to make the same PayPal payment each year automatically.

Sheldon: When will we begin accepting E-Transfers?

Jeremy: I will bring this up with Scott at the next directors meeting.

[Update: There may be extra work for Scott to set up online banking for our non-profit banking account at this time but it is being considered.]

OTC/SEPAR Report

Gord Kirk: On behalf of Surrey Emergency Program Amateur Radio (SEPAR) I want to say thank you for the regular contributions you give that keep us active and repairing equipment. We have improved the relationship we have with the City of Surrey (CoS), Surrey Fire Service (SFS), and the Police Service (RCMP). When the use of the building was terminated, the Fire Services were also impacted and have helped to steer the City to find a replacement location for the Emergency Program and SEPAR at the same time.

There has been a recent change in staffing and compounding this the pandemic has made things more difficult.

NEPP (Neighborhood Emergency Preparedness Program), ESS (Emergency Social Services), SFSAR (South Fraser Search and Rescue serving Richmond, Delta, Surrey, Langley) are also part of the emergency program.

SFS has some space near the containers we are currently using for storage and are looking at sharing the space used for SFSAR. We are still evaluating the space to see if it can be used as an OTC. We have been given permissions to start discussions with the City of Surrey about what would be required to raise a tower at that location.

Every 4th Thursday of the month SEPAR has a meeting and SARC has requested every 2nd Wednesday of the month for meetings. This month Jason Biggin will be providing an online talk on APRS and we will extend the invite to SARC members.

Ion Marinescu: I don't know much about the history here, but it would be great if we could produce an article for the Communicator that talks of the history of SARC/SEPAR working with the City and Fire Services.

Gord Kirk: Yes this has been a topic of discussion before and the SEPAR articles each edition are starting to develop into this.

Fox Hunt/Field Day 2020 Report

Anton James: The Fox hunt is a well established event in the SARC calendar. We usually have the Fox Hunt in early May but we were in the midst of the big lockdown this year. We selected Aug 29th and were able to continue with the hunt itself but skipped the BBQ this year to meet the provincial health and safety regulations..

John Brodie: We now have a number of Fox Hunt receivers available for sale. They were produced by Les Tolko and Steve Miller. They are \$125 each.

Stan Williams: SARC is also purchasing a few of these receivers.

Anton James: We only had 80meter foxes again this year but two classes of hunters. Here are the results from this year's event.

Novice:

1st place Thomas Abbott ZSITE found 5 transmitters in 33mins 5sec

2nd place John Schouten and family - VE7TI found 5 transmitters in 41mins

3rd place Ken Patenaude et all - VE7NOW found 5 transmitters in 53mins

Advanced:

1st place Henry Dhal VE7HRY found 5 transmitters in 30mins

2nd place Amel Krdzalic VA7KBA found 5 transmitters in 31mins

SURREY AMATEUR RADIO COMMUNICATIONS

Christmas Luncheon

Jinty Reid: We had scheduled the Christmas Luncheon at the Guildford Golf and Country Club on 152nd street for December. If we want to host the event in 2020 we may need to go down to 6 people per table. Things could change between now and then and it may be cancelled we just do not know at this time. Entertainment would be cancelled this year due to COVID restrictions.

John Schouten: I think the current rules prohibit any form of buffet so it would need to be a served meal of some kind.

Sheldon Ward: If they (Guildford Golf and Country Club) have a set requirement that we need to guarantee that a certain number of people show up. I would think it could be hard to find 30 people that want to go as a group until after COVID.

Stan Williams: I'm quite glad for us to proceed with this as planned. The venue will not be restrictive of having customers, and am quite appreciative of the effort put into planning this so far.

Jinty Reid: A quick show of hands for those that would like to proceed and how many would like to postpone to 2021.

18 people vote for Sat Dec 5th 2020 and 4 people vote for postponing to Sat Dec 4th 2021

[The 2020 Christmas lunch has now been cancelled]

Gaming Grant

Steve McLean: Every year we receive funds from the BC Gaming Grant process. Every summer we submit a large binder of details in our grant application. John Brodie has prepared this for the last couple of years so I'd like to thank him for his efforts. Applause is given for John Brodie.

Funds for this year were put towards some repairs to existing equipment. In January we had the old yellow tower sandblasted and repainted. We revived the old repeater site and installed a new Yaesu Fusion Repeater in that south site. We purchased an Antenna Rotator with cables and controller in anticipation of use on a tower at a new OTC eventually. We will also purchase a training laptop soon. Normally we would need to spend those funds before the end of the year however with the lack of activity due to COVID we are not submitting a Gaming Grant application this year.

7. New and other business

John Brodie: Re: Weekly net. We're thin on net control operators, at present we have 1 person for every week of the month but do not have all the backup spots filled.

1st Tue Jean Luc with no backup

2nd Tues Jinty with backup is Sheldon Ward

3rd Tues Rob Gilchrist with no backup

4th Tue Kapila with John Brodie as backup

5th Tue No primary and backup is John Schouten

Gord Kirk: In reading The Communicator and the writeup from Brad who is stuck in Columbia and able to talk to home right now is invaluable.

Sheldon Ward: If we are planning to use the new Fire Training Facility are we able to improve the airflow?

Gord Kirk: Will make an inquiry about this with the SFS.

Stan Williams: Can Gord also get some user instructions for the audio/visual equipment in the training facility?

Stan Williams: Our general flow of meetings has been to have roughly an hour presentation every month and on occasion we have had just social meetings. Would you like to have just social meetings or should we try and fill every month with a presentation?

John Schouten: Given the current situation I don't think we should be encouraging a lot of social situations.

Elizabeth Gilchrist: Perhaps we should revisit this topic after COVID.

Ion Marionescu: I guess because of the short notice this year for the fox hunt we did not have many kids. Regardless Jean-Luc joined me last year and passed his test. This year he invited one of his colleagues and a friend of his. Since then I made some small fox transmitters and they had lots of fun. It's a nice way to promote amateur radio to young people.

Stan Williams: Has anyone heard about JOTA (Jamboree on the Air) Scouts?

Elizabeth Gilchrist: I think most of the Scout events are now closed due to COVID

SURREY AMATEUR RADIO COMMUNICATIONS

8. Election of Directors

Anton James: I have appointed Steve McLean to coordinate the election.

Steve McLean: Provided slides to review the director's, executive roles and responsibilities.

We are electing 6 directors tonight although we normally elect 4 per year. There were several resignations hence the additional vacancies.

The board will decide which seats will be for 1 year and those or for 2 years.

Candidates currently confirmed are:

- John Brodie
- Gord Kirk
- Kevin McQuiggin
- John Schouten
- Stan Williams

1st call for nominations from the floor

2nd call for nominations from the floor

3rd call for the nomination from the floor.

Steve McLean: Hearing none, these directors will be elected by acclamation

Rob Gilchrist: Do we need to make a motion that the ballots be destroyed?

Answer: The ballots were not marked or collected so they do not require this.

9. Adjournment

Anton James moved that we adjourn the meeting. Second by Kevin McQuiggin. Carried

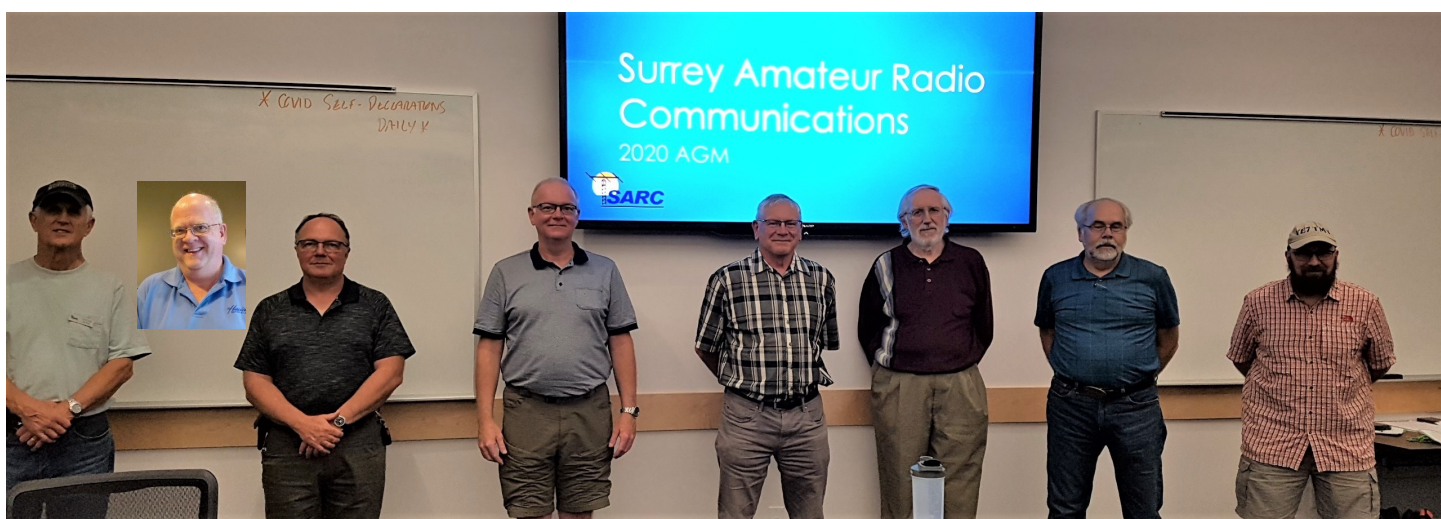
Meeting Adjourned at: 8:42pm

~ Minutes prepared by Jeremy Morse VE7TMY



The 2020 SARC AGM

The SARC 2020-2021 Board of Directors



Ham Gear For Sale

For sale are **Four 8' long tower sections** = 32' free standing. The bottom anchors are missing as they were left in the concrete, after it was taken down. **\$75.00 or best offer.**

Contact: Kjeld VE7GP 604 531 6396 or VE7GP@telus.net

RigExpert "AA-55 Zoom" antenna analyzer. Less than a year old. Purchased new at HRO in Portland, OR in January 2019. The unit has the original box, manual, all accessories and is in perfect shape. On sale price at HRO is US\$328.95. That is $\$328.95 \times 1.32$ or C\$434.21. **For sale at C\$375.00**



70 cm Fast Scan TV Transmitter

For sale is an analog fast scan (NTSC standard) ATV transmitter in a hardened and waterproof metal case. Suitable for mounting outdoors. Last used by hams at Simon Fraser University on an emergency communications project in the early 1990s. Runs on 12 VDC. Approximately 100 feet of power/antenna/control cables included. As is, but if it doesn't work to your satisfaction you can return it. **\$100 OBO.**

Contact: Kevin McQuiggin VE7ZD/KN7Q mcquiggi@sfu.ca

Kjeld has a rather large Marine Radio (HF?) sitting at his home and he'd like to find a new home for it. If you're interested contact him.

Contact: Kjeld VE7GP@telus.net

MFJ 269 antenna analyzer plus dipper coils \$150

Covers 1.8 to 170 MHz and 415 to 470 MHz

IC 910H VHF/UHF all mode transceiver \$1500

Fully loaded for 2m, 440 MHz, 1.2 GHz

Includes:

HM-36 hand mic and manual

UX910 (for 1.2 GHz operation)

FL132 (main band narrow CW filter)

FL133 (sub-band narrow CW filter)

CR293 (high stability crystal)

UT106 (DSP noise reduction/auto notch)



I can also provide at additional cost:
2m/440 MHz/1.2 GHz triplexer so you can use this
radio on a single multi-band antenna and
CT-17 CI-V level converter for interfacing this and
other radios to your computer

WANTED: OLD NATIONAL GEOGRAPHICS AND READERS' DIGEST
MAGAZINES. John VA7XB va7xb@rac.ca or 604-591-1825



SURREY AMATEUR RADIO COMMUNICATIONS



General Meeting Minutes

October 14, 2020

Attendees: 23

Meeting Start: 7:13pm

Location: Online Zoom Meeting

- Call to order & presentation of agenda (John VA7XB)
- AGM report and presentation of New Board & Exec. (Jeremy VE7TMY)
- Self-Introductions - new members and visitors: VE7YJ Hugh Jones, VE7SUF Jenny, VE7PJC Pat Grundle, Leo Hussini VE7LZL, and Bill Mayer introduce themselves to the group.
- Announcements (all)
- Financial Report (Scott VE7HA)
Scott VA7HA presented a financial report that shows us with a healthy bank balance.

Committee/Liaison Reports

- **Gaming Fund (Steve VE7SXM)**

We have spent money on repairing the 'old yellor' tower, a rotator, cable, and control box. We budgeted for a training laptop also. We also purchased a Yaesu Fusion repeater installed at the south repeater site.

We did not submit a gaming grant application this year.

- **SEPAR (Gord VA7GK)**

SEPAR is the emergency program with Fire Services and the City of Surrey. We will be participating in the "Shake-Out" Earthquake drill tomorrow 10:17am. There will be an

impromptu net after the shake on the VE7RSC 147.360mhz + 110.9 and everyone is welcome to check in.

On Thursday, Oct 22, 2020 (the 4th Thursday monthly) is the SEPAR AGM. It will be a hybrid Zoom and physical meeting at the Fire Training Center at 7pm. You need to email Gord va7gk@shaw.ca to ensure there is room for attendance or via a zoom link. Don VA7GL@shaw.ca can help with the WinLink setup. So far 1068 hours have been volunteered this year by SEPAR members.

There is a weekly net at 7:30pm Tuesday nights on the VE7RSC repeater just before the SARC net at 8pm.

The 1st Wednesday of the month the EMBC has a PREOC radio test and SEPAR will be involved in this test.

- **Ham Class (John VE7TI)**

We started a class in February but in the 3rd week we lost our classroom as a result of COVID restrictions. We scrambled to get everything online, and finished that with only one week lost. The demand was so high in the summer that we ran an online only class. We then started a fall class in the training center but we're limited to 15 students and it's now turned into a hybrid online/in person class with an additional 14 online students. Logistically, this has now turned into 2 separate classes but some of the in person members find it's useful attend the online training on Monday evening giving them a head start for the Tuesday evening classroom session.

A January 18/19, 2021 class is being planned now with both online and person courses.



SURREY AMATEUR RADIO COMMUNICATIONS

The usual Basic class J-pole antenna workshop has been cancelled due to the pandemic and safety guidelines currently in place.

• Membership (John VA7XB)

There are currently 97 paid members in the club in good standing;

Plus 21 from the spring ham class;

Plus 30 from the fall ham class.

In the next week or so we will send a final email to remind those that have not made their payment of dues.

Communicator (John VE7TI)

Some contributions are starting to be received and the next Communicator is about to be drafted.

We're always looking for stories and articles written up about experiences our local members have had. Please send articles, images, stories to communicator@ve7sar.net

• Operations & Training Centre (Gord VA7GK)

No significant update yet but we are still waiting on next steps.

John Brodie says that we are looking for someone that can weld aluminum. VA7FMR knows a contact named David ??

The Christmas party (Jinty VA7JMR; Motion #1: John VA7XB)

Last meeting we took a vote and the direction was to go ahead with the planning. Buffet must be served by staff and we could have 4-6 people per table. People would have to stay and socialize with those at their table only.

John Brodie moved that: *"In view of COVID restrictions and anticipated low turnout, the 2020 Christmas party be cancelled."* Seconded by Robert VA7FMR Passed by 20 attendees of 23 who agree with the motion.

• Contests (John VA7XB)

Before COVID we had approximately 1 contest per month.

The RAC Winter Contest Award was shown

The BC QSO Party Award was shown

Plans will be to start to form a group for the next RAC contest and BC QSO Party. John VA7XB and Jim VE7FO's stations are available.

Re: the Washington state QSO Party, The Salmon Run. John Schouten VE7TI, Fred VE7IO and other distributed multi-op stations were setup primarily for DX contacts and not well setup for Washington state. An NVIS antenna would have served us well if available, perhaps next year.

New Business

• Purchase of foxhunt receivers (Motion #2: John VE7TI)

This year's foxhunt was delayed from May but took place in September. The NEW version of Foxhunt receivers work great and are for sale; contact John Brodie VA7XB at JohnVA7XB@gmail.com

John Schouten moved that: *"Pursuant to discussions previously approved by the Directors, SARC purchase 5 Foxhunt receivers for use in training, public events, and the annual Foxhunt event and that, in addition, 5 fox transmitters be purchased once they are available."* Seconded by Steve McLean. Passed by 20 of 23 who agree with the motion.

• Surrey Grant application (John VA7XB)

We did not spend a grant for field day because of the COVID/Pandemic. We would like send a note to the City of Surrey that we would like to apply the \$500 towards the OTC.

• Net & Repeater Issues (John VA7XB)

We're short on net control operators on some nights of the month. If interested please contact John Brodie VA7XB.

Hugh Jones VE7YJ volunteered to run net control given some training.

We have some noise occurring on the VE7RSC system and one of the first things we can try may be to disable the south repeater site.

SURREY AMATEUR RADIO COMMUNICATIONS

Gord and David will begin troubleshooting this issue. Steve McLean is also available to help.

- **CW Class (Kevin VE7ZD / KN7Q)**

We started in January and got about 2/3rds of the way through then used the repeater for code practice until we were unable to meet due to the pandemic. There is still interest in starting a second course and a few from the first that may want to pick up and finish their training.

- **SARC name tags for purchase (Scott VE7HA)**

Next meeting via Zoom, possibly with a presentation.

Invitation to the Kalmar for Saturday breakfast

Close (John VA7XB)

Meeting Adjourned at: 8:45pm

~ Minutes prepared by Jeremy Morse VE7TMY

Scott VE7HA, our Treasurer has name tags that need to be distributed. Please contact him at 604-862-6265 or by email at

scott_hawrelak@telus.net

- VE7KAT Scott
- VA7UB Ralph
- VA7RVM Rob
- VA7TQB Thomas
- VA7EAE Michael
- VA7JJY Johnny
- VA7FTT Rick
- VE7POL Emery
- VA7PE Nell
- VE7HSF Sally
- VA7GSN Howard
- VE7GKD Thomas
- VE7DSG Jordon

Your Membership

If you have not already renewed, your membership in SARC expired as of last June 1st.

If you believe this is in error please advise and I will check it out. Otherwise, you are requested to renew your membership prior to the next AGM, which is tentatively scheduled for September 9th.

Note that only those whose membership is in good standing may vote or be eligible to run for a Director's position.

Payment may be made in one of several ways:

1. Use PayPal on the SARC website: www.ve7sar.net
2. If we meet, bring a cheque or cash to the AGM on September 9th.
3. Mail a cheque to our Treasurer Scott Hawrelak
13935 80A Avenue, Surrey V3W 6P5

Dues are as follows:

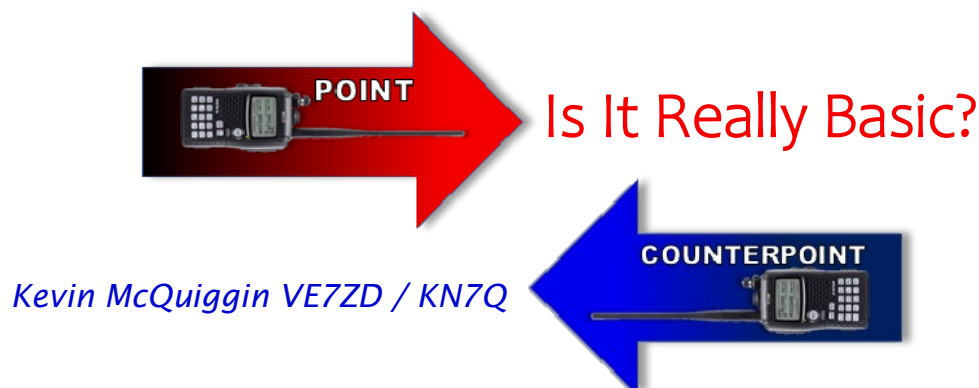
- Individual \$31
- Individual (if RAC member) \$26
- Family \$41
- Family (if RAC member) \$36

Thankyou for taking care of this as soon as possible.

~ John Brodie VA7XB
Membership



SURREY AMATEUR RADIO COMMUNICATIONS



In the QRT column in the last issue, John Brodie VA7XB asked: "Is It Really Basic?" suggesting the need for a lower threshold of knowledge for those who never intend to use HF. Here is Kevin McQuiggin VE7ZD / KN7Q's counterpoint.

Good points. I agree, many if not most new hams or want-to-be hams are operationally focused and not too interested in the technology itself. This is too bad, but the hobby attracts people with a different focus these days than it did in decades past.

I think this is largely because that idea of radio as "magic", a technology that allows you to talk to people from all over the world, has been lost. Global communication is taken for granted these days and people no longer see it as anything special.

I remember my father gathering the whole family around the broadcast radio in our kitchen the late 1960s because a CBC reporter had managed to reach MOSCOW (gasp!) and was interviewing a political dissident. It was amazing to hear words live from somewhere as remote and as foreign (indeed dangerous) as the USSR. This was over the telephone system but still embodied the amazing global reach of technology. Radio was magic, and the idea that you (or me as a young kid) could actually send a signal around the world, and hear others from far away, was unbelievable.

I am obviously showing my generational bias, or at least my old-fashioned generational perspective here.

Communication, even global communication is no longer magic, it is a commodity, it is routine, it is free, it is something that some younger folks complain about when the frame rate doesn't support HD, or their social media audio is choppy. To talk to many young folks about HOW radio and communications works is, to them, boring. Probably only 1 in 100 kids (the future engineers) would have any interest.

Whether email or social media, the location of the other party is irrelevant. Actually, most young folks don't use email much anymore: I see this in my teaching. Email is so "20th century". Many of them don't use list servers either.

There has been a fundamental change in attitude towards radio technology and the "how" of technology in general. Barring a technological apocalypse I don't think that radio's reputation will ever be what it once was. AMC's "The Walking Dead" deals with such an apocalypse and has introduced radio as a longer distance communications medium in the last few seasons, but their treatment of it is unrealistic - hardly anyone understands radio or how it works anymore, especially writers for entertainment series. Radio is simply a plot mechanism that polarizes people or reinforces helplessness.

But I digress...

I think that what you are essentially proposing is a new radio service. I don't see the need for this, as services like FRS are already available - dumb consumer devices that would "fit the bill" perfectly for these folks who just want to push to talk and don't really have any interest in how the

SURREY AMATEUR RADIO COMMUNICATIONS

radios work. It might be better for ISED to roll out regulations for higher power FRS radios rather than to further degrade technical requirements of the amateur service.

One key philosophical idea behind the federal regulation of amateur radio beginning in the 1920s was to support a cadre of technically-literate people who can act as military or civil emergency communications reserve in time of crisis or war. ISED's support of this goal means that they would probably not have any interest in creating this new class of amateur license.

On the other hand, as policy makers are products of their own generations, the majority of folks making policy these days may not see this big picture anyway, nor might they possibly see any need for the idea of maintaining a "technical communications reserve". This group of folks might therefore be all in favour of the new license class. However, I am sure that there are still some big picture thinkers at high levels of government who see the strategic benefits of amateur radio as we do. I guess I am talking on both sides of the issue, but your question generates interesting debate.

My bottom line opinion though is that if the government wants to support basic operators who just want to push and talk in the back

country, then it would be better to revamp FRS and permit the radios to have higher power. No point really in trying to license them in the amateur radio service. That is fundamentally not (if policy makers still believe it) what ham radio is about.

I think that it will generate greater benefit to society to maintain amateur radio's technical standards and ensure that continuity of technical skills in that sliver of the public who are licensed hams. In the event of a disaster or other major event, they will be happy to have us. I also agree with John VE7TI in that people should be expected to work hard and study for a test, they will then actually know something about radio and also feel that they have achieved something, and thus treat the privileges with more respect. Even if they don't need to understand the electron and current most of the time, they will still have some knowledge about it, and this may benefit them (and society) in some small way in the future.

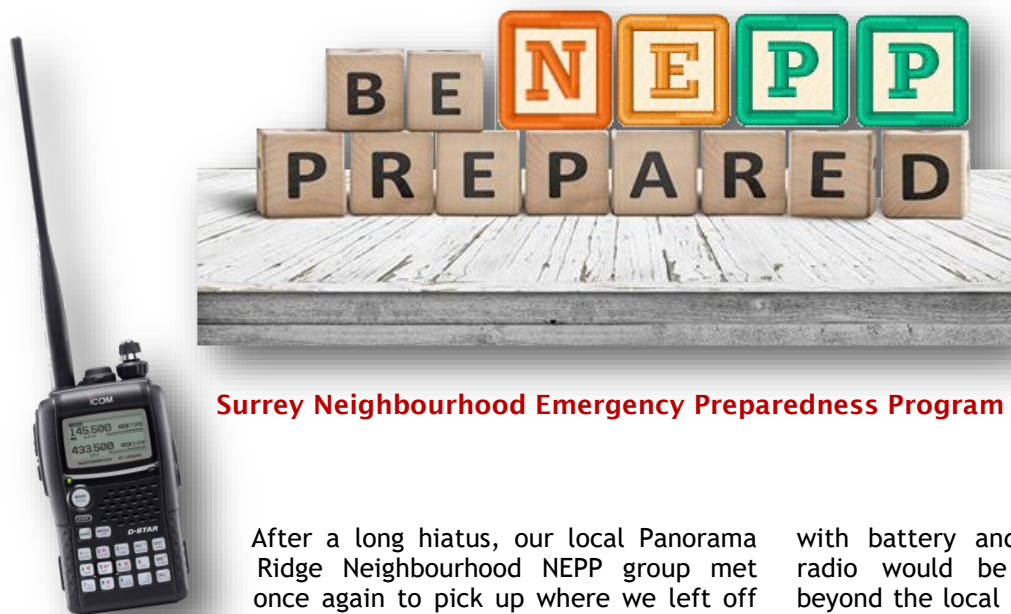
I am rambling, I suppose, just some thoughts on your interesting question. I look forward to further discussion!

~ Kevin VE7ZD / KN7Q

*We did it, our own DXCC!
Our blogsite counter
passed 100 countries last
month after the
September-October
Communicator issue was
published and jumped
quickly to 123.*



SURREY AMATEUR RADIO COMMUNICATIONS



Surrey Neighbourhood Emergency Preparedness Program

John Brodie VA7XB

After a long hiatus, our local Panorama Ridge Neighbourhood NEPP group met once again to pick up where we left off before COVID hit in February. It was a warm Fall day in late September so the group could enjoy the sunshine. It is significant that only a small number of neighbours was willing to attend this meeting despite it being outside with good separation. When will this change?

Nevertheless, 2 of the 5 task leaders gave their reports. Heather described facilities available if needed for shelter & caregiving: bedding, food, fuel for generators and cooking, camping equipment and water including potable supply and non-potable (rain barrels). The Shelter & Caregiving unit will also double as the neighbourhood assembly location. All were encourage to create their own emergency supplies and be as self-sufficient as possible.

John described communication equipment available which include base station, mobile radio and handheld radio for HF and VHF/UHF

with battery and generator backup. Amateur radio would be deployed if communication beyond the local area is required. A few of the task leaders had also tested walkie-talkies (GMRS/FRS) and reported that they are usable within our neighbourhood over a distance of 1 km where it is relatively flat. In other areas where the terrain is hilly or uneven and line-of-sight cannot be achieved, walkie-talkies will be less effective. The group was encourage to purchase their own walkie-talkies with chargers, become familiar with their usage and have them fully charged and ready at all times. Vehicle transportation, if needed, would be arranged with a couple of neighbours who have vehicles suitable for carrying injured persons.

Lack of entry/exit to our local area was identified as a concern, as only one road and one walkway provide access to the subdivision. Other issues discussed were the need to identify gas, power and water shutoffs for all residents.

Another meeting has been scheduled for late November with task leaders to present their plans for First Aid, Utilities & Fire Suppression and Search & Rescue.

We are coordinating our local planning with the larger neighbourhood comprised of over 1000 homes on the Ridge, but appear to be the first to do so.

~ John VA7XB

Additional information is available for at: [Neighbourhood Emergency Preparedness | City of Surrey](#)



SURREY EMERGENCY PROGRAM AMATEUR RADIO



SEPAR Report The SEPARS AGM

Gord Kirk VA7GK
SEPAR Coordinator

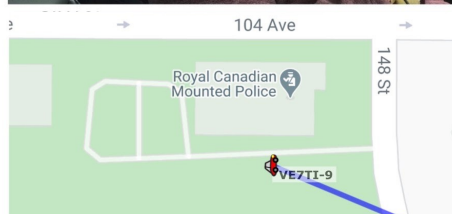


It has been a busy few months in SEPAR. Traditionally the fall is a time when we start with new activities as the Summer vacation season ends.

This fall has been no different with the exception of most of the meetings have occurred via Zoom due to limitations on meeting together.

In September Jason VA7ITJ gave an excellent Zoom presentation on APRS. It was a great topic on how using your radio for reporting your location can be done. The usefulness in an Emergency Program for APRS was obvious.

Great BC Shakeout
response to Guildford
RCMP Station



We also had a first for SEPAR in the Fire Hall 1 EOC Radio room. A commercial radio, which is used for EOC to EOC communications, was installed. The radio uses the Greater Vancouver Inter-Municipal Emergency Radio Network (IMERS). The system is tested once per month by the radio room at the Southwest Provincial Regional Emergency Operations Center (PREOC). This month SEPAR was able to check in on behalf of the city.

Moving forward SEPAR will be scheduling a member to attend and manage this check in for the City.

In October the annual Great BC Shakeout occurs on the third Thursday of October at 10:17. This year SEPAR conducted an emergency exercise with a spontaneous Net after the “earthquake” following our protocol. After an earthquake or severe weather event SEPAR members (and any other Amateur Radio Operator) check in on the SARC repeater. Someone will establish a net and start listing available radio operators and any damage they have seen.

Any amateur can pass along their “front porch” or “windshield” report. This year we had the net control ask for members to attend to the Fire Hall radio room in preparation for the formal net to hand over to the EOC radio room and other attend various locations. One couple attended a local RCMP district office (outside) and another young amateur checked in with a report from his High School. Several individual participated passing on a visual report on bridges, highways/road conditions, river height and condition etc. Last one important connection was also made with the

Salvation Army regional office in a nearby municipality.

All of this demonstrated how amateur radio can assist in providing almost instant updates from throughout the community.

An interesting note a couple of days later a 7.5 magnitude earthquake occurred in Alaska which also triggered Tsunami concerns for several hours afterwards. This was a good reminder of why we practice for earthquakes when we live on the west coast.

Also in October we held our Societies annual AGM. The elected officers and directors are the same from the previous year. Here is the list of current positions and who holds them:

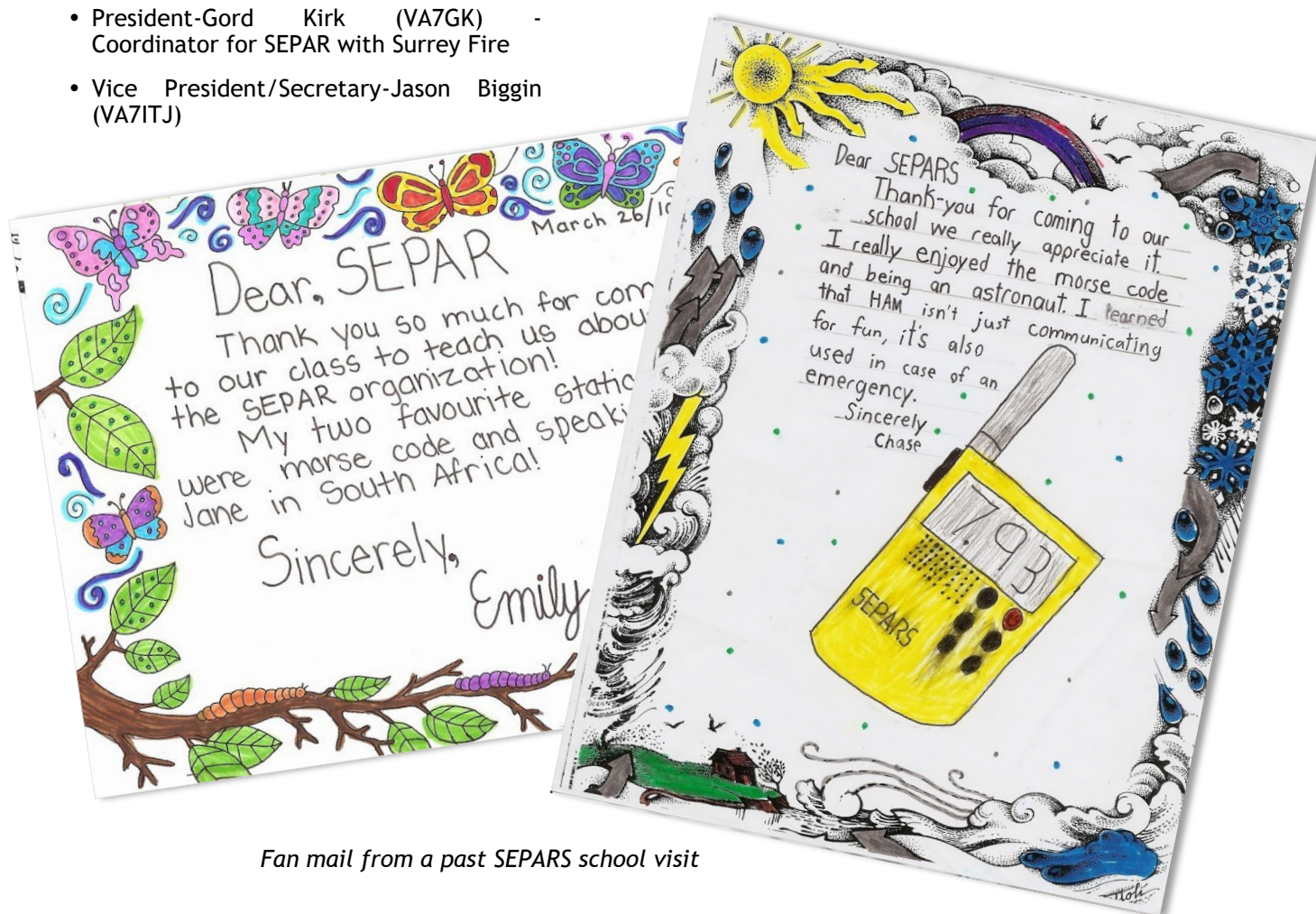
- President-Gord Kirk (VA7GK) - Coordinator for SEPAR with Surrey Fire
- Vice President/Secretary-Jason Biggin (VA7ITJ)

- Treasurer-Drew Elvins (VA7DRW)
- Director-Stan Williams (VA7NF)
- Director-Rob Gilchrist (VE7CZV)
- Director-John Schouten (VE7TI)
- Director-Ion Marinescu (VA7ION)

We look forward to the fall and continuing to support the Emergency Program through SEPAR.

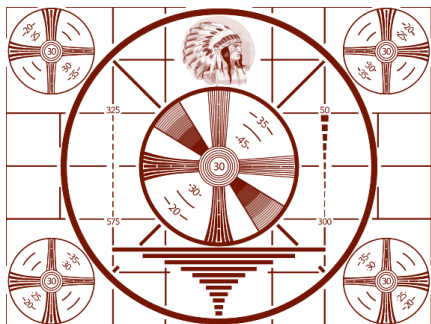
If you have any questions about SEPAR or would like to get involved please reach out to us.

~ Gord Kirk VE7GK



Fan mail from a past SEPARS school visit

NEWS FROM CLUBS



53 miles on ATV

A Low cost drone and microwave gear !

Boulder, CO—The Boulder ATV hams were out again on Sunday, August 23rd trying to push the distance frontier with their microwave gear. This time, they returned to the 5 cm, 5.8GHz band with the el-cheapo, drone, FM-TV gear. The hams participating this time were: N0YE, WB2DVS, WB2DVT, N0FZB, KH6HTV, AB0MY and WB5PJB.

TV Repeaters Rptr-55.doc (9/1/2020, kh6htv) p. 8 of 15 AB0MY and WB5PJB were the farthest separation. Bill, AB0MY, was at Rabbit mountain open space, north-west of Longmont. Gary, WB5PJB, was in the Cabela's parking lot on I-25 at the extreme south part of the Denver metro area. The distance between the two of them was 53.4 miles (86 km). The photo is Bill's FM-TV signal as received by Gary. Other hams at intermediate locations also were able to successfully exchange FM-TV pictures. Unfortunately, Dr. Murphy again showed up. Pete & Debbie's transmitter went up in a puff of smoke. Their Banggood 2 Watt, amplifier burned out. They ended up in receive only mode. Bill ended up in transmit only mode as he lost the DC power cable for his FM-TV receiver.

We have discussed this FM-TV equipment and it's use in several earlier newsletters dating back to last fall, 2019. The typical 600mW transmitter & companion receiver sells for only \$30 on Amazon. Most are using the L-Com, 23dBi, BBQ grill dish antenna which sells for about \$65. Gary, WB5PJB, was using a 25", 30dBi, Ubiquiti RD-5G-30 dish antenna (\$150). Some were also using the Banggood 2 watt "after-burner" amplifier which sells for \$25.

Thus the total cost of only about \$100 for the basic microwave components of transmitter, receiver and dish antenna.

Caution: The Banggood 2 Watt amplifiers are quite unreliable. All of us have blown out at least one or more of them. Failure mechanism? Obviously in some cases too much input RF. But others ? Their reliability rate is fast approaching ZERO ! We are analyzing the dead units and we seem to be pointing our fingers at improper heat sinking, in at least some of them. We hope to report in a future issue of this newsletter our findings, and hopefully our corrective measures.

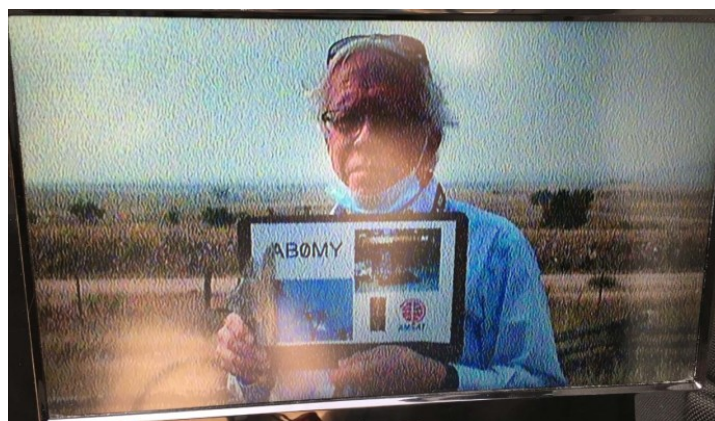
~ Courtesy Boulder Amateur Television Club TV Repeater's REPEATER - September, 2020

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

Jim Andrews, KH6HTV, editor
kh6htv@arrl.net www.kh6htv.com

Bill, AB0MY, 5 cm, FM-TV signal
as received by Gary, WB5PJB -- 53 miles



We're QRT for this issue

I'm Back!

John Brodie VA7XB



This will be my first QRT since being elected President for 2020-21. Your new Board of Directors is comprised of several long-time amateurs with a vast array of experience, as well as younger members who bring enthusiasm and talents in the world of IT. I look forward to working with this excellent group.

We are faced with a few challenges, but an even greater number of opportunities, including setting up a new Operations & Training Centre (OTC), participating in joint projects with SEPAR, the Neighbourhood Emergency Preparedness Program (NEPP) and the City of Surrey, as well as adapting to new ways of running our meetings and presentations. The ham classes are fuller than ever, with the public ever more acutely aware of the need to prepare for the unseen and the Communicator is being viewed by thousands around the world as the premier club publication.

Our recent November meeting was the first we have tried on Zoom. Jeremy VE7TMY is to be thanked for setting it up so capably, choreographing the agenda, presenting and tracking votes on motions. All attendees I have heard from claim the meeting was a success and a positive experience. I have to agree and I'm sorry we didn't try it earlier rather than remaining incommunicado for the last 6 months.

Conducting meetings on-line has some distinct advantages: 1) it allows participation by members who otherwise would have difficulty in attending meetings due to age, distance or poor health; 2) it widens the potential scope of our membership to locations anywhere in the world; and 3) it facilitates presentations from far and wide, without a need for a personal presence. We have already seen new members from other provinces take part, a welcome addition.

The Zoom format is flexible, and easy for participants to ask questions, hear the answers and even vote on motions. We can see the names of persons who are talking, we see their faces and can interact with them almost as easily as in person.

There is order to the meeting as only one person can speak at any given moment, so the confusion of multiple voices is eliminated. Furthermore the combination of mic headsets and audio settings allow those with poor hearing (like me) to participate more fully. Zoom even has a feature that will allow the meetings to be recorded and replayed later.

SARC SOCIETY DIRECTORS 2020-2021

PRESIDENT

John Brodie VA7XB
[president at ve7sar.net](mailto:john@ve7sar.net)

VICE PRESIDENT

Steve McLean VE7SXM
vice [president at ve7sar.net](mailto:steve@ve7sar.net)

SECRETARY / WEBMASTER

Jeremy Morse VE7TMY
[secretary at ve7sar.net](mailto:jmorse@ve7sar.net)

TREASURER

Scott Hawrelak VE7HA
[treasurer at ve7sar.net](mailto:scott@ve7sar.net)

DIRECTORS

Gord Kirk VE7GK
(SEPAR Liaison)

Kevin McQuiggin VE7ZD / KN7Q

John Schouten VE7TI
(SARC Publications/Blog/Social
Media & Courses)
[communicator at ve7sar.net](mailto:john@ve7sar.net)
[course at ve7sar.net](mailto:john@ve7sar.net)

Stan Williams VA7NF

SARC MEMBERSHIP, NET & CONTEST MANAGER

John Brodie VA7XB
[membership at ve7sar.net](mailto:john@ve7sar.net)

SARC QSL MANAGER

Heinz Buhrig VA7AQ
15684 102 Avenue
Surrey, BC V4N 2G4

SARC REPEATER MANAGER VACANT

[repeater at ve7sar.net](mailto:repeater@ve7sar.net)

So, probably we should continue to use Zoom or equivalent media for our general and Executive meetings. I can see this happening for the next few months or at least until we are permitted to resume some level of normality. Your Executive will be looking for suggestions of suitable presentations that can be drawn from material already available on YouTube, or made possible by live-streaming of willing presenters.

However, a ham club exists partly for social reasons and, despite the advantages on on-line meetings, it would be a mistake to continue with this format to the exclusion of in-person gatherings. I would argue that we could benefit from a mixture of personal and on-line activities to gain the advantages of both.

So, yes, we should continue to have Christmas parties (but not this year - decision already made to cancel), summer socials and to meet for breakfast on Saturdays.

Those with health issues should continue to take self-protection measures that allow them to participate, or simply stay away if they are still uncomfortable with social contact.

We might also consider the option having an on-line meeting for business and technical presentations once a month, and alternate these with once-monthly social events to augment the breakfast meetings. For this to happen, there has to be a sufficient number of members who are willing to attend - my impression is that we are not yet at that favourable state, based on the minimal breakfast turnout.

Your Executive would appreciate hearing your views on this controversial subject.

~ John VA7XB



Brrr, it looks and feels like Fall out there! Time to look at the shack, the workshop and weekend contesting. Surrey Amateurs are getting a bit more active, including a resumption of regular monthly meetings albeit via Zoom. You should be receiving notifications via email but keep those 2nd Wednesday evenings free as we roll out a line-up of guest presenters.

WINTER'S COMING...



Remembers also the SEPAR 4th Thursday meetings live or via Zoom with topics focused on emergency communications. We hope to see you there. In the meantime...

Take care, be careful, stay healthy!

Down The Log...

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the [Surrey Fire Service Training Centre](#),
14923 - 64 Avenue, Surrey,
BC. Here is a what3words
link and map:
<https://what3words.com/markers.addiction.ozone>

Weekly SARC Social

Saturday between 0730 and
0930 hrs at the Kalmar
Family Restaurant 8076
King George Blvd.
Surrey

SARC Net

Tuesday at 2000 hrs local
on 147.360 MHz (+)
Tone=110.9

SEPARS Net

Tuesday at 1930 hrs local
on 147.360 MHz (+)
Tone=110.9

VE7RSC Repeaters

2m North: 147.360MHz+
Tone=110.9Hz
IRLP node 1736
Echolink node 496228
2m South: 147.360MHz+
Tone=103.5Hz Fusion
capable; No IRLP/EchoLink
1.2m: 223.960 Mhz -1.6
Tone=110.9
70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

We are looking for a SARC Net Manager. Its not a difficult job and, if you have some time to spare, we'd like to hear from you. Basically it involves scheduling someone to do the Tuesday evening weekly net.

	SARC Net 20:00 Hrs
1 st Tuesday Standby	Jean-Luc VA7JLU Vacant
2 nd Tuesday Standby	Jinty VA7JMR Sheldon VA7XNL
3 rd Tuesday Standby	Rob VE7CZV Hugh VE7YJ
4 th Tuesday Standby	Kapila VE7KGK John VA7XB
5 th Tuesday Standby	Jinty VA7JMR John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	



We Have A SARC Patch!

These are suitable for sewing on a jacket, cap or your jammies, so you can proudly display your support for SARC.

The price is \$4 each or three for \$10 and they can be picked up at a meeting or the weekly Koffee Klatch.

We thank our sponsors for their support of SARC

Please support them.



Successful Guide to the Basic Exam for the Canadian Amateur Radio Operator Certificate

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The Most Efficient Guide for the Basic Exam

- Focuses only on the exam material
- Organized by ISED's Eight Categories and questions
- 103 Pages, emailed to you as a pdf
- Uses the same language as the exam questions
- Helps you understand and remember the material
- Explains "tricky" questions
- E-transfer \$20 to vicd@uwaterloo.ca, of which \$10 supports the Kitchener Waterloo club's educational work.

www.ve3yt.com for the guide, my intro book and cw course

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<http://www.htihydraulics.com/about-us.html>

